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CIVIL AFFAIRS GUIDE

THE FISHING INDUSTRY IN TAIWAN (FORMOSA)

OPNAV 13-29

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Vice Admiral, U.S. Navy,
Vice Chief of Naval Operations.

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CHART

Taiwan, fishing ports ..... Inside front cover

SUMMARY

The fishing industry of Taiwan (including the adjacent islands) normally furnishes a large part of the protein food needs for the inhabitants of the region. Local production, however, is normally supplemented by imports of processed fish from Japan. During the war period fishing operations have been curtailed and production may reasonably be presumed to have dropped considerably.

It is advisable that the restoration of the fishing industry be undertaken as soon as possible following occupation. Commercial fishing will be important in feeding members of the armed forces and the population of Taiwan. The leading concern will be the production of fish for use as food within the region rather than production of fish for export. Normally fresh fish is exported from Taiwan to Japan.

In order to achieve this end, attention might first be given to small-scale commercial operations. For this type of fishing, kits such as those devised by the Foreign Economic Administration for use in the South Pacific should prove useful. (Appendix C describes these kits). Larger scale operations offshore — trawling on the grounds of the China Sea and fishing for bonito and tuna — should be resumed, however, as soon as security permits, because this type of fishing accounts for a very large part of the total catch. Fish culture, important in this area, should also be maintained.

The main fishing areas and seasons are summarized below for the various types of fish important in Taiwan waters:

Fish	*Main area of production*	*Main season*
bonito	Eastern waters primarily, but also to north, south and to the west (Pescadores)	Early March to mid-October
tuna	Eastern waters, especially to the northeast and southeast	June, July and August
tai (sea breams)	Western waters	All seasons
guchi and eso	Western waters	All seasons
mackerel	Some in all waters	April to July
sardine	All waters	All year
grey mullet	Western waters	Winter
swordfish } spearfish }	Eastern and southern waters	Summer
sharks	All waters, largest numbers in northern, eastern and southern waters	April, May and June
whales	Southern waters	Winter

The detailed requirements for the restoration of the fishing industry cannot be adequately estimated at present. Large numbers of fishing boats are known to have been taken over by the Japanese armed forces. Further losses of boats and equipment depend in part upon the nature of the naval and military operations in this area. If destruction of fishing equipment is widespread, the gear needed to restore the fisheries to former production will be large. Table 1, p. viii, lists the equipment needed for the production of about 50 million pounds of fish of the types important in Taiwan waters. (Taiwan in recent years has produced 50 to 65 million pounds of sea fish.) Although it is likely that all of this gear would not be needed for use in Taiwan, such a supply would provide a stockpile for later use as occupation forces move into Japan.

Fishing boats will require repairs; new boats will be needed. A few trawlers might be sent to operate in the South China Sea and Taiwan Strait, operating from Taiwan bases. Later these boats could be shifted northward to bases in Japan. Small boats can be built in Taiwan, and marine engines can perhaps be provided at Keelung, where such manufacture has been undertaken in recent years.

The distribution of fish to the population will present a major problem. Much of the fish will be marketed fresh to larger towns and villages; care should be taken to prevent spoilage. The possibility of including refrigerating units in the port areas is worth investigation.

Special attention should be given to the government records concerning fisheries, both those of the division of marine industries of the government-general and the various fishery departments of the provinces. As soon as possible these records should be examined with the aid of competent translators. A survey of commercial boats and gear should be made. With this knowledge of existing conditions, a group of fishery experts, including men competent in bonito and tuna operations, trawling operations and the processing of fish under tropical conditions, could then proceed with a definite program for placing operations on a systematic production basis.

TABLE 1.—*Estimate of the gear required to catch 50,000,000 pounds of fish*

Material	Haul seines (100) (ca. 700 yds. long)		Gill nets (1000) (ca. 300 yds. long x 2 yds. deep)		Trammel nets (200) (ca. 300 yds. long x 2 yds deep)		Hand lines (3000) (ca. 150 ft. long)		Travel lines (50) (ca. 1200 ft. long)		Troll lines (1500) (ca. 400 ft. long)		Dredges (25) (ca. 3 ft. wide at mouth)		Spears (150)		Purse seines (12)		Small otter trawls (25)		Total		Value
	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Tons	Per ton
Cotton:																						
Twine	20,000	10	130,000	65	14,000	7	6,000	3	2,900	1.45	7,500	3.750	125	.06					2,250	1.12	114.370	@ $2,000
Rope	....	....	....	....	8,000	4	....	....	....	....	....	....	....	....			64,000	23	....	....	4.000	@ 1,000
Steel rope	15,000	7.5	40,000	20	....	....	....	....	....	....	....	....	....	....			23,600	11.8	2,750	1.30	40.600	@ 500
Iron	....	....	....	....	....	....	....	....	a2,500	1.25	....	....	1,575	.9	450	.24	2,600	1.25	12,500	6.25	9.890	@ 500
Steel:																						
Chain and cable	....	....	....	....	....	....	....	....	....	....	....	....	4,250	2.1	....	....	....	....	50,000	25.00	27.100	@ 1,000
Hooks	....	....	....	....	....	....	b63	.03	c200	.1	d60	.015	....	....	....	....	....	....	....	....	.145	@ 2,000
Leaders	....	....	....	....	....	....	e100	.05	....	....	f60	.025	....	....	....	....	....	....	....	....	.075	@ 2,000
Brass: swivels	....	....	....	....	....	....	g63	.03	....	....	h30	.015	....	....	....	....	....	....	....	....	.045	@ 2,000
Lead: leads	10,000	5	50,000	25	10,000	5	9,000	4.5	....	....	3,000	1.500	....	....	....	....	26,000	13	....	....	54.000	@ 250
Cork: floats	30,000	15	68,750	34.4	13,700	6.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	56.200	@ 2,000
Lumber: buoys	....	....	....	....	....	....	....	....	i1,000	.5	....	....	....	....	....	....	....	....	....	....	.500	@ 200
Bamboo: poles	....	....	....	....	....	....	....	....	....	....	j1,500	3.750	....	....	....	....	....	....	....	....	3.750	@ 400
Tar	90,000	45	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	92.500	@ 200
Total	165,000	82.5	288,750	144.4	45,700	22.8	15,228	7.61	6,600	3.30	12,110	9.055	6,250	3.05	450	.24	211,100	96.35	67,500	33.67	403.175	

a 100 anchors.
b 3,000 swivels.
c 10,000 hooks.
d 1,500 hooks might be substituted.
e 1,500 wooden hooks.
f 100 wooden legs. Lead hangs can be substituted.
g 1,000 brass swivels.
h 1,000 bamboo poles.
i 9,000 feet steel leader wire.
j 1,500 feet steel leader wire.
k 1,000 bamboo poles.

I. GENERAL SURVEY

The fishing industry of Taiwan, which includes coastal and deep sea fishing, rather extensive fish culture, and less important fresh-water fishing, contributes considerably to the economic life of the island. Direct employment is created for only 3 per cent of the total population. However, a goodly portion of the dietary demands of the population is supplied, the basis for a processing industry is founded, a sizable item in the export trade is established, and encouragement and business are given to other industries — shipbuilding, salt manufacture, etc. — which are either closely or remotely related.

The commercial fishing catch in recent years has amounted to 55 to 70 million pounds valued at 12 to 16 million yen. The catch in 1938 amounted to 2½ per cent of the total catch of the Japanese Empire, and 4 percent of the catch of Japan proper. In addition fish produced by culture amounted to 5 million yen. Manufactured products, chiefly dried and salted fish, were valued at more than 2 million yen. (Table 2.) Exports of fish, largely fresh fish sent to Japan, were valued at 3 to 5 million yen in recent years.

TABLE 2.—*Taiwan: value of fish catch, fish culture and fish manufactures, 1933-1938*

[Yen]

Year	Fish catch (exclusive of fish culture)	Production from fish culture	Manufacture of fish products
1933	10,806,670	3,223,832	1,908,982
1934	11,452,341	2,890,340	2,290,923
1935	13,639,986	3,483,582	2,290,741
1936	14,934,405	4,207,178	2,500,289
1937	14,513,106	4,545,292	2,324,009
1938	15,670,812	5,525,265	2,358,530

Notwithstanding the importance of the fishing industry and its growth and steady increase in exports in recent years, Taiwan is a net importer of fish. It depends on Japan for dried, salted, and canned fish valued annually at 10 or 11 million yen. Net imports thus amounted to about 6 to 8 million yen in 1937 and 1938. Although not self-sufficient in fish now nor expected to be in the near future, with further development of the industry eventually Taiwan could attain self-sufficiency.

Japanese fishing interests control the greater part of the industry. Most of the fishermen are either united in associations, or are working for entrepreneurs, the majority of whom are Japanese.

During the war the fishing industry has suffered greatly. Fishing boats, particularly the larger efficient ones, have been requisitioned by the government, and the severe rationing and high price of gasoline have caused difficulties for the remaining boats.

II. FISH RESOURCES AND FISHING GROUNDS

1. The sea fisheries

To the north and west of Taiwan are the China Sea and the Taiwan Strait which constitute a major fishing area of thousands of square miles. Some of the chief fishing banks of this area are around the Pescadores. Off the precipitous east coast of Taiwan runs the *Kuro Siwo* (Japan current) in which migratory fish — bonito, tuna, mackerel, swordfish — move northward from the Philippines. The seas off South China and the waters of the South Seas are also easily accessible with Taiwan as a base. Thus, although Taiwan has comparatively few bays and gulfs and few close-lying reefs and shoals, its fish resources are large.

Several hundred species of fish live in the waters surrounding Taiwan, many of them common in Japan, although the marine fauna are largely tropical. Considered below and in table 3, p. 4, are only those species which are taken in commercial quantities. The relative importance of various fish constituting the sea catch is indicated by table 4, p. 5, which shows production from 1932-1939.

a. *Sparidae* (*sea breams or porgies*). Members of this family known as *tai* by the Japanese are found throughout the waters of Taiwan, but are most numerous in the seas off the west coast. These are among the most abundant fish and account for a considerable part of the commercial production. Since 1925, however, the catch of these species has decreased in proportion to other species. In this group are the red *tai* or red snapper which are taken in quantity in the western and southern sea areas. *Renko dai, kuro dai* and *chidai* are three other species taken in large numbers.

b. *Thunnidae* (*tunas, bonitos, etc.*). The bonito and katsuwo or "soda bonito", reported to be *Sarda chilensis* and *Katsuwonis pelamis* respectively, are of wide distribution in the seas north, east and south of Taiwan. *Maguro* or tuna (*Thunnus orientalis*) abounds in offshore waters, especially in waters of the Japan current.

In the past the main bonito grounds were concentrated off the northeast coast, but in recent years they have also covered the southern home waters and been extended southward through the Batan Islands to the seas of northern Luzon in the Philippines. The main fishing season is from early March to the middle of October.

c. *Scombridae* (*mackerels*). Several species, especially *aji, saba* and *sahara* or *sawara* are important food fish taken in large numbers. These fish occur in schools, and many species are migratory.

d. *Clupeidae* (*herrings and sardines*). Several species of this family are important in commercial production. By weight, sardines constitute the second largest catch of fish, being surpassed only by sharks (table 4).

e. *Spearfish and swordfish.* Reference is made both to spearfish and swordfish in the Taiwan area. The species of spearfish is reported as *Tetrapturus angustirestus*, and that of swordfish as *Xiphias gladius*. Probably both species and perhaps other species of spearfish are referred to as *kajiki;* the names seem to be used interchangeably.

These are excellent food fish and are common especially in the Japan current. In the Takao region *kajiki* are taken the year round, with January, February, May and June reported as major fishing seasons.

f. *Sharks.* Sharks of several kinds are caught in Taiwan waters in both the north and the south. Near Taichu and Tainan provinces they are taken in April, May and June. The so-called "sakata" shark (scientific name not known) weighing as much as 100 kin, is one of the types commonly caught.

g. *Other products.* Other fish of economic importance are *guchi* (Sciaenidae), *bora* or mullet (*Mugil* sp.), and *eso* (Sauridae). Whales are

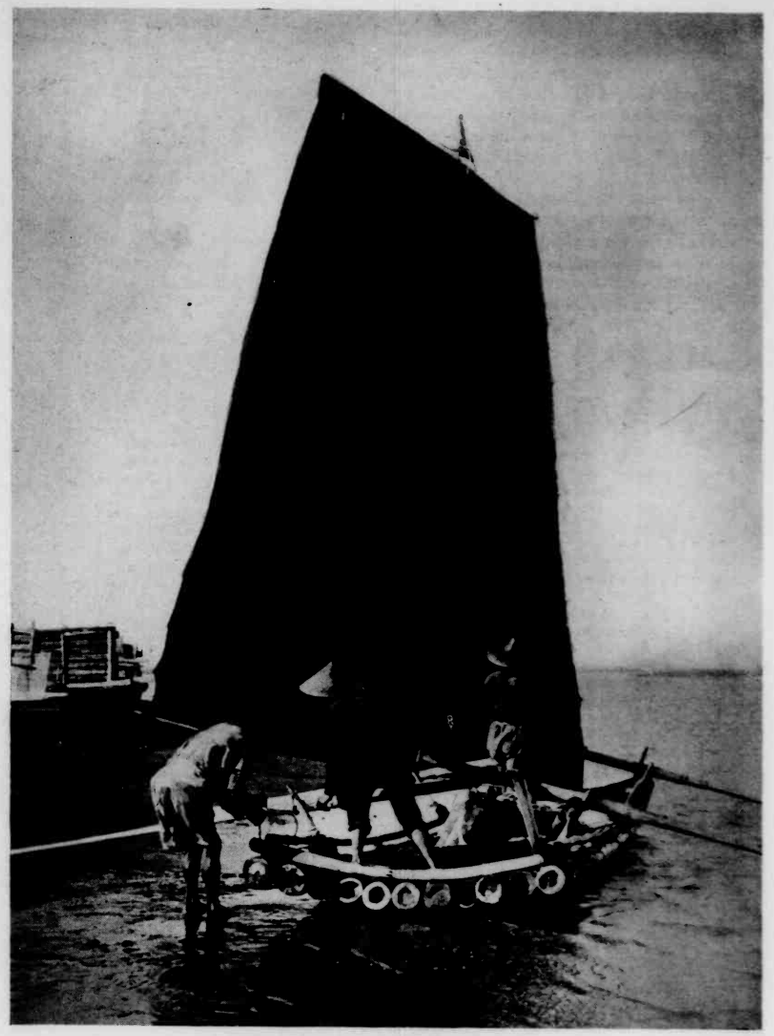

Figure 1.—A *teppai*, characteristically Formosan raft

taken in the southern waters. Shrimps, cuttlefish, lobsters, clams, oysters and turtles are produced in commercial quantities. Seaweeds suitable for commercial production are abundant on the northern seacoast and in the Shoko-to. Coral is produced commercially (see pages 12, 14). *Takase* and other shells are found in some areas, but the gathering of shell does not form an important part of the fisheries.

h. *Fishing grounds.* The fishing grounds for some of the leading species have been indicated, but the general grounds can be briefly summarized as follows: In the northern sea area, *tai*, bonito, tuna, shark and swordfish; in the eastern sea area, bonito, tuna, shark and swordfish; in the western sea area, grey mullet, mackerel, and *tai;* and in the southern area, tuna, bonito, shark and *tai.*

TABLE 3.—*Taiwan: major commercial species of fish*

Taiwan name	*Scientific name*	*English equivalent*
SEA FISH:		
aji	*Scombersomorus commersoni (Cybium commersoni?)*	horse mackerel Spanish mackerel
bonito[a]	Thunnidae: *Sarda chilensis* (?) (also other species)	bonito
bora	Mugil sp. (including *Mugil cephalus*)	grey mullet or mullet
chidai	*Pagrus cardinalis*	sea bream
eso	*Saurida tumbil* and other Sauridae	
frigate mackerel[a]	*Auxis thazard*	frigate mackerel
guchi	Sciaenidae	croaker
kajiki	*Tetrapturus angustirestus* (also used for *Xiphias gladius* ?)	spearfish swordfish
katsuwo	*Katsuwonis pelamis*	bonito
kuro dai	*Sparus macrocephalus*	sea bream
maguro	Thunnidae: *Thunnus orientalis?*	tuna or tunny
mangatsu	Clupeidae	sardine
renhodai / renko dai	*Pagrus tumifrons (Dentex tumifrons)*	sea bream
red sea bream[b] / red snapper / red tai	*Pagrus major* (and other Sparidae?)	red sea bream
saba	Scombridae: especially Rastrelliger species	mackerel
sahara / sawara	*Scomberomorus niphonium* (Cybium niphonium?)	kingfish, king mackerel
shark	Galeidae	shark
tai	Sparidae	sea bream (family name)
zato	*Megaptera nodosa*	humpback whale
FISH CULTURE (Salt and fresh-water)		
bora	Mugil species	mullet
kenhii	*Labes kontius*	?
koi	*Cyprinus carpio*	carp
renhii	*Hypophthalmichtys moritrix*	?
sabahii	*Chanos chanos*	milkfish
topminnow[a]	?	topminnow
tsuohii	*Ctenopharyngodon idellus*	?
FRESH WATER FISH		
ayu	*Plecoglossus altivelis*	sweetfish
eel[a]	*Anguilla japonica*	eel
funa	*Carassius auratus*	?
koi	*Cyprinus carpio*	carp
renhii	*Hypophthalmichtys moritrix*	?

[a]Common Taiwan name not known.
[b]These three names all seem to be used in Taiwan for the same species. However, the true red snapper (Lutianus sp.) may be also caught.

NOTE:—The identification by species is not possible in some cases because of lack of correlation between common names and scientific names in this area. For some fish, therefore, family and/or genus names are listed rather than species. Because of lack of specific information for this area, it is also probable that some of the identifications are incorrect. Shellfish and crustaceans, not listed here, are also taken in considerable quantities.

TABLE 4.—*Taiwan: fishery catch, 1932-1938*
[In 1000 *kan.* 1 *kan* = 3.75 kg or 8.27 lbs.]

Year	Sardine	Bonito	Tai	Shark	Tuna	Sword-fish	Shellfish	Shrimp	Cuttle-fish	Coral	Weed	Total including others
1932	1,512	969	328	1,603	808	868	16	106	146	2.6	136	9,197
1933	2,258	1,173	569	1,493	813	858	42	123	212	2.4	64	10,807
1934	2,834	1,572	430	1,854	857	1,190	53	129	186	1.2	83	11,452
1935	2,651	1,386	415	1,936	869	1,131	62	166	245	3.7	67	13,640
1936	2,898	1,284	483	2,031	1,348	1,054	409	151	306	5.3	97	14,934
1937	1,788	1,262	456	2,214	1,459	1,150	248	178	123	2.8	86	14,513
1938	2,094	264	307	1,626	971	669	206	199	193	1.5	145	15,608
1939	1,824	1,130	215	1,837	1,674	978	182	210	136	4.9	154	25,183

2. Fresh-water fisheries

The fresh-water resources are much smaller and the fisheries less promising than those of the ocean. There are few large rivers; most streams are short and torrential without the quiet reaches which provide a prolific source of fresh water marine life. There is but one large inland lake, Jitsugetsutan, or Candidius. Natives of the interior fish in the inland waters for subsistence purposes, but these resources account for only a small part of the commercial catch. In recent years the commercial production of the fresh-water fisheries amounted to 820,000 pounds, as compared with the 55 - 70 million pounds of the total commercial fish catch.

Of the fresh-water fish taken commercially the most important are *funa* (*Carassius auratus*), *kenhii* (Labes kontius), eels (*Anguilla*), *koi* or carp (*Cyprinus carpio*), *renhii* (*Hypophthalmichtys moritrix*), and *ayu* or sweetfish (*Plecoglossus altivelis*). Fresh-water crustaceans and shellfish also figure in the production.

3. Fish for culture

Sabahii (milkfish) and *bora* (grey mullet) are particularly important for fish culture in both salt-water and fresh-water farms. Also raised are *tsuohii, renhi* and *kenhi.* A minnow known locally as topminnow is propagated to a large extent for combating malaria. (See page 12 for further discussion of fish culture.)

III. FISHING CRAFT AND FISHERMEN

1. Fishing craft

a. *Number.* In 1937, the latest year for which data are available, 1,053 power boats, about 4,000 sailing vessels, and 5,279 bamboo boats (*teppai*) were in operation. Table 5 shows the relative number of power boats and sailing vessels for 1934-1937 and several earlier years. The number of *teppai* operating in fishing has varied from 5,000 to 6,500 during the period 1922 to 1937.

TABLE 5.—*Taiwan: fishing craft for 1934-1937 and selected earlier years*

Year	Power vessels	Sailing craft
1922	174	3,914
1925	498	4,325
1929	819	4,091
1934	848	3,519
1935	905	4,047
1936	1,082	4,124
1937	1,053	[a]4,077

[a]Another source gives this figure as 3,939.

Since the beginning of the war the Japanese government has taken over many fishing boats for military purposes. It is reported that 811 boats were taken from the Taiwan fishing fleet. This is only 16 per cent of the total number of craft (excluding *teppai*), but since the vessels taken were undoubtedly the newer, larger ones, it can be expected that there has been a serious reduction in the catch because of this loss.

b. *Types.* More than 80 per cent of the catch of sea fish is made by motor boats. Although the average size of these is 17 tons, the figure has little meaning because the craft vary considerably in size. Steam vessels are not numerous. They numbered 6 in 1930 with a total tonnage of 1,136. More than 200 craft in 1937 were known to be deep-sea vessels. The increase in power vessels (indicated in table 5) corresponds with the expansion of the fishing industry. Although the shallow water bordering the western and southern coasts favors the use of small boats, the larger resources that can be reached by power boats have caused the increased production. Moreover, the roughness of water bordering Taiwan, there being strong monsoons from October to March in the north, and frequent typhoon centers from April to November in the south, calls for the employment of vessels with at least auxiliary power and sturdy construction for the undertaking of deep-sea fishing.

The sailing craft average 2 to 3 tons. The *teppai* or *tekpai* is a rather unique type of fishing boat — a bamboo boat clumsy in appearance but useful under the skilful operation of the Formosan-Chinese. These boats, commonly used by the part-time fishermen, are most numerous on the west coast from Tainan Province southward.

c. *Construction.* The construction of *teppai* and the small sailing craft is undertaken in many ports of Taiwan, the first type being built by Formosan-Chinese. The power vessels are built mostly in Japan, in part because the firms operating and owning the ships have their headquarters there. By 1930 there had been, however, some development in shipbuilding in Taiwan, and boats were being turned out in increasing numbers. In Keelung is located a plant for the manufacture of marine engines, which are installed in locally built boats. Encouragement was given to the shipbuilding industry in recent years, the government-general granting subsidies to those who constructed fishing vessels.

2. Fishermen

a. *Number and type.* More than 170,000 persons are considered as deriving their livelihood wholly or in part from fishing and fish culture. The number of persons engaged in fishing alone in recent years is 125,000 (table 6). Approximately 50,000 to 52,000 persons are engaged in fish culture (51,120 in 1929, the last year for which such a figure is available). In addition to these there is a seasonal immigration.

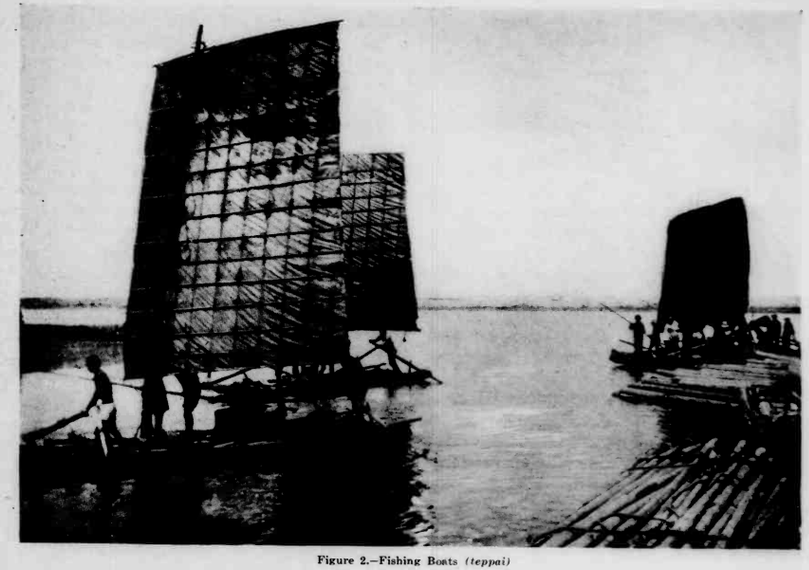

Figure 2.—Fishing Boats (*teppai*)

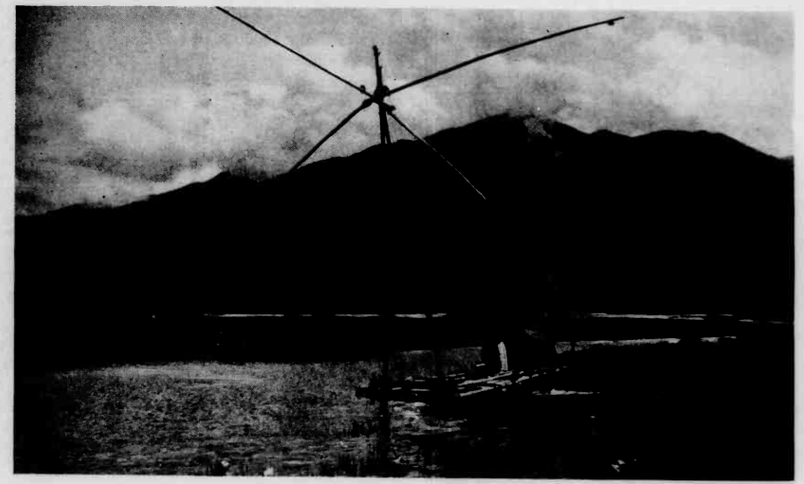

Figure 3.—Jitsugetsutan Lake, with local fishing craft

INTENTIONAL SECOND EXPOSURE

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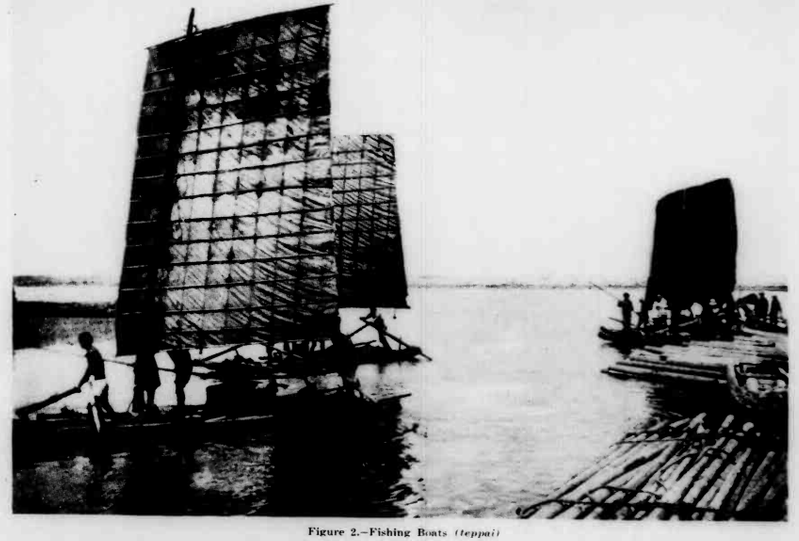

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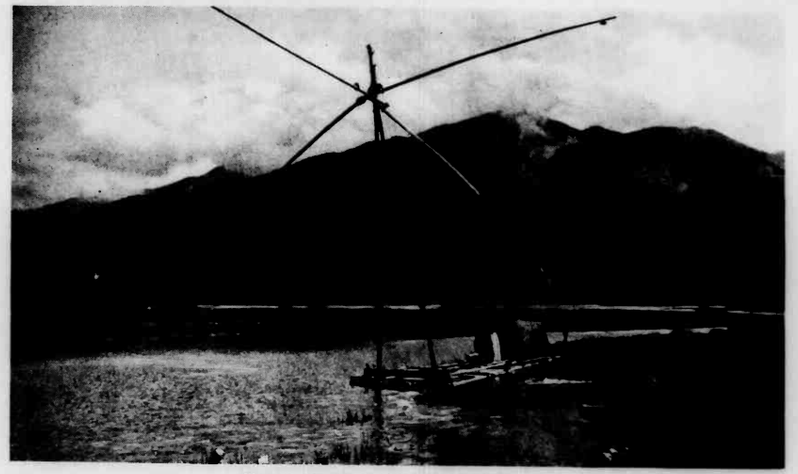


Figure 3.—Jitsugetsutan Lake, with local fishing craft

TABLE 6.—*Taiwan: Number of persons engaged in fishing, 1934-1937*

1934	118,371
1935	119,371
1936	126,868
1937	122,981

In both types of enterprises the majority of persons are engaged only part-time. In 1929, for example, of the 197,822 persons engaged in fishing and fish culture, 127,444 or 65 per cent were part-time fishermen. In fishing alone the percentage of part-time workers is, however, smaller — about 58 per cent in 1935. Most of those who engage in fishing as a part-time occupation, chiefly Formosan-Chinese, are also farmers. Some derive a major part of their income from fishing, whereas others derive but a minor portion.

Formosan-Chinese predominate in the fishing industry. In 1929 they were 96 per cent of the total number of people engaged in fishing and fish culture. Since that time the percentage has dropped slightly, but of the total more than 90 per cent are still Formosan-Chinese. It is in fish culture that this numerical superiority is greatest (table 7).

TABLE 7.—*Taiwan: numbers of persons engaged in fishing and fish culture, by type, 1929*[1]

	Full Time		Part Time		Total
	Employers	Employees	Employers	Employees	
FISHING					
Japanese	1,513	4,872	80	147	6,612
Formosan-Chinese	15,104	38,288	25,885	54,945	134,222
FISH CULTURE					
Japanese	1	....	12	37	50
Formosan-Chinese	2,469	6,283	10,831	31,487	51,070

[1] Later data by this breakdown are not available.

Some years ago subsidies were granted to encourage the immigration of skilled fishermen from certain prefectures in Japan. An immigrant colony was established at Suo, and perhaps smaller ones at other places. (The colony at Suo was established prior to 1930, and its success led to the belief that other colonies should be established.) The importance of such colonies is the accompanying expansion of deep-sea fishing and the increasing use of large motor vessels.

b. *Distribution.* Although no data are available concerning the distribution of fishermen in Taiwan, it is known that fishermen are most numerous in and near the cities of Takao, Anping, Keelung, Suo and in the Pescadores Islands. (Near Keelung are several villages in which almost all the inhabitants are fishermen.) According to one estimate 70 per cent of all fishermen are in Taihoku and Takao Provinces and the Pescadores.

c. *Wages.* Most fishermen do not receive regular money wages but receive a certain percentage of the net proceeds from the sale of the catch. In the Takao district the division, with some variations, is as follows:

The owner of the boat receives 55 per cent of the net proceeds from the sale of the catch. The other 45 per cent is divided among the crew, the captain and the chief engineer, each receiving 1½ man's share. The net proceeds are arrived at by deducting expenses for food, ice, oil, bait fees and other running expenses and, in addition, 10 per cent of the gross receipts. Out of the 10 per cent, 7 per cent is used for fish market service fees, 1 per cent becomes a fish association fee, and 2 per cent is placed in a sinking fund. From the sinking fund and fish market fees the owner of the boat receives a cut of 1 per cent. In one 9-man crew, the captain and the engineer had a total income in one year of ¥ 1,085.62; the crew members, ¥ 723.75.

Sometimes in the larger centers commercial fishermen are hired at regular daily wages. In 1936, the only year for which such data are available, Formosan-Chinese fishermen in Keelung received ¥ .80 per day, and Japanese fishermen ¥ 1.08; in Takao wages were ¥ 1.15 per day for Formosan-Chinese fishermen, and ¥ 1.60 for Japanese.

d. *Organization.* Many fishermen, especially those engaged in fishing full-time, are united into associations or are working for entrepreneurs. In 1937, 62 fishermen's associations with a total membership of 16,516 were in existence (see page 22).

IV. FISHING OPERATIONS: METHODS, GEAR AND PORTS

1. Methods and gear

In the coastal waters many small-scale operations are carried on by Formosan-Chinese fishermen with primitive appliances such as bamboo traps and baskets, small beach seines, and cast nets. The commercial fisheries, however, depend on modern Japanese methods including the use of drag nets, trawls, seines, and hook and line angling from power boats. The details available concerning the operations in Taiwan waters are meager; summarized below, however, is information concerning some of the major methods.

a. *Drag-net fishing.* Operating in shallow waters from about latitude 21° 30′ N. northward to the East China Sea are motor vessels which, working in pairs, tow drag nets. In 1935, 50 units of 100 boats caught fish valued at ¥ 3,180,000. The catch in 1938 was somewhat higher, and was valued at ¥ 4,440,000, or about one-fourth of the total catch. These operations, based upon Keelung and Takao, are 10 or 12 day trips for ground species particularly of the *tai* family, but including Sciaenidae, Sauridae and other fish. Drag-net fishing is also reported for swordfish, sharks and tuna, with Keelung, Suo and Takao as bases for this fishing.

b. *Trawling.* Steam trawlers of the Kyodo Gyogyo Kaisha (subsidiary of Nippon Suisan Kabushiki Kaisha) operate in the waters of the East China Sea, Taiwan Strait, and the South China Sea. Most of such vessels are based on ports in southern Japan, particularly in Nagasaki and Yamaguchi prefectures. They fish 300 to more than 1,000 miles from home ports with their catches placed in cold storage until they return to ports of southern Japan. The voyages take 12 to 20 days with about 8 days spent in actual fishing. In recent years more than 20 such vessels have operated in the South China Sea, of these 3 or 4 in Taiwan waters. In addition 3 or 4 trawlers operated south of 25° N. by permission of the government-general of Taiwan. The value of the catch obtained by trawling off Taiwan in recent years is reported as varying from ¥ 460,000 (1935) to ¥ 1,163,000 (1938). The number of vessels bringing in the catch in 1935 was 7; the number for 1938 is not known.

Some years ago, parts of the trawling grounds off the north and west coasts of Taiwan were forbidden to trawlers in order to protect these areas from devastation. The exact location and extent of these forbidden areas and their present status are not known.

c. *Other net fishing. Katsuwo* are caught with nets known as *machi ami* and *ojiki ami* in large numbers from April to July. In 1938 this catch amounted to about ¥ 411,000.

Spread nets are used for mackerel. Seines, probably purse seines, take sardines and members of the mackerel family. Near Keelung torch-net fishing is undertaken.

d. *Hook-and-line fishing.* Hook-and-line fishing from boats is the chief means of catching bonito. In 1938, 21 vessels were engaged in bonito fishing and landed about 2,000,000 pounds. Not all, but most of these were vessels which took bonito by hook and line. Tuna, shark, horse mackerel and other species are also taken by hook and line.

When a school of bonito or tuna is found, small fish (sardines or herring) are thrown into the water to stop the advance and the fishing begins. For bonito, bamboo poles measuring about 20 feet in length and a 25-foot, strong line with hook attached are used. On the hook is attached a live fish as bait. As the bonitos bite, live bait may be replaced by lures.

e. *Spear fishing.* Spearfish and swordfish are taken by spearing (presumably harpooning) from vessels which operate out of Suo and Keelung. About 480 vessels were engaged in this fishery in 1938, when the catch was valued at ¥ 225,000.

f. *Sekko fishing.* Along the coasts of Shinchiku and Taichu Provinces curved stone walls a few feet high are erected on the beach to retain large numbers of fish with the ebbing of the tide. Some

of these walls are 5,600 feet long. *Sekko* fishing, as this method is called, includes in some parts of Taiwan the use of bamboo walls or nets.

g. *Other methods.* Trolling, although not specifically mentioned, may be used for some surface species such as tuna and bonito. Trawl lines, fishing at depths of several hundred feet, are said to be used for tuna. This method presumably is used largely in winter when the fish do not swim near the surface. Many types of nets not mentioned in this report are also used, but the details of operation and construction of such gear are not available.

Both hook and line and nets are used for catching fresh-water fish. In rivers bamboo fish traps are also operated. *Ayu, renhii,* and *kenhii* are caught largely by hook and line; *koi, funa* and others by nets. *Ayu* is so highly prized as a delicacy that if nets were permitted the supply would soon be exhausted.

2. Fishing ports

The fishing industry of Taiwan centers in a few ports, notably Keelung, Takao, Anping and Suo. Daibanretsu, in the extreme south (Takao Province), is the whaling port. Although the Pescadores have important fisheries, these islands have no single port comparable to the 4 fishing ports of Taiwan proper. Mako, the largest fishing center of the Pescadores, is increasing in importance, but much of the fishing is based on small villages which dot the bays and inlets of these islands.

Keelung and Takao are large commercial ports as well as fishing ports. Takao is the base for deep-sea fishing, southward to the Philippines. Fishing vessels embarking from Takao sometimes remain at port more than 20 days. Suo, built primarily as a fishing port, has an artificial T-shaped basin providing wharves for a fishing fleet. These three ports all have sizable fishing fleets of power boats as well as sailing craft. Anping, on the other hand, is largely a port for *teppai* sailing craft. At Karenko on the east coast a harbor, including facilities for fishing boats, was being built in 1937 and 1938. This was probably completed so that fishing boats no doubt are based on this port.

The relative importance of the main fishing ports is suggested in Table 8, which gives the valuation of the industry on a percentage basis by provinces for 1930. Although the data are old, the relative position is thought to have been substantially the same in 1938.

TABLE 8.—*Taiwan: relative importance of chief fishing ports, 1930*[1]

	Percent
Taihoku Province (Keelung and Suo)	47
Takao Province (Takao)	26
Tainan Province (Anping and Daibanretsu)	14
Other provinces	3
	100

[1]This does not include the Pescadores, for which data are not available.

Most other ports in Taiwan lack protective features for small vessels, especially craft that cannot be drawn from the water during storms. *Teppai* can and are used from other ports, but motor vessels and sailing craft without safe anchorages easily accessible are endangered. (In 1929 only one *teppai* was wrecked, whereas 26 motor vessels and 14 sailing vessels were wrecked, mostly because safe harbors for the latter types of craft were lacking.) Since early times writers have commented upon the "inhospitable shores of Formosa."

From time to time appropriations have been made in the budget of Taiwan for the establishment and improvement of fishing ports. These have for the most part been small amounts, however, allowing for but minor improvements. The ports of Suo and Karenko are the two that have received the largest amounts in recent years. Encouragement and subsidies are given to other port aspects, such as provisions for the handling and storage of catches, and equipment for the maintenance of live bait at the various ports.

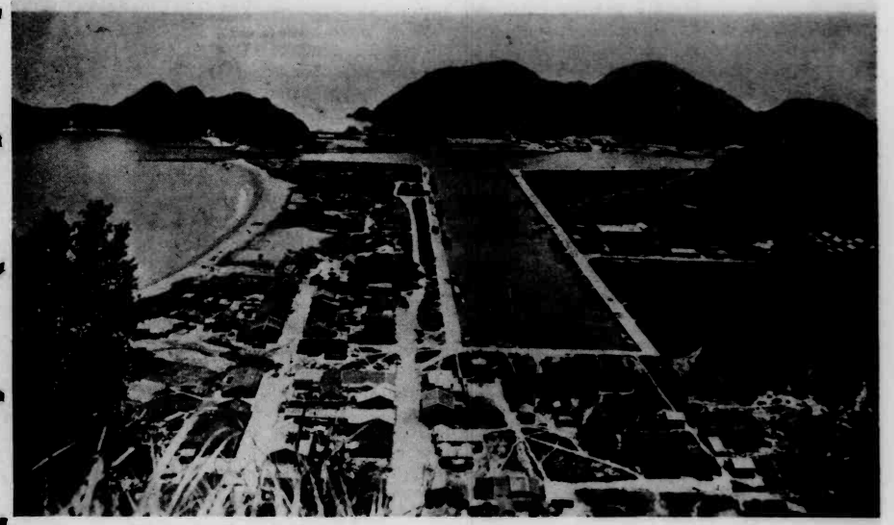


Figure 4.—Suo Harbor. Southern edge of the inner harbor appears as a sandy crescent beach. Artificial basins (6 and 9 feet deep) are constructed for the fishing fleet. View from the Suo-Karenko motor-road.

V. SPECIAL FISHERIES

1. Fish culture

a. *General.* Fish culture, of long development in Taiwan, is of considerable importance in the fishing industry of the island, accounting for about one-fourth of the total fish production by value (Table 2, p. 1). Taiwan has more than 11,000 fish farms covering in all approximately 70,000 acres. *Sabahii, tsuohii, renhii, koi, bora,* oysters and crustaceans are the chief products raised, although several other types are also bred (Table 9, p. 12). It is customary to combine several kinds of fish or crustaceans with fish.

Most of the farms are in the central and southern parts of the western coastal region where flat land, reported of little use for other productive purposes, is eminently suited to this industry. In 1929, the last year for which detailed statistics are available, of the 68,000 acres devoted to fish culture 45,000 acres (66 per cent of the total) were located in Tainan Province, 10,500 acres or 15 per cent in Takao Province, 8,300 acres or 13 per cent in Shinchiku Province, and 3,100 acres or 5 per cent in Taichu Province. The warm climate of the island encourages the rapid breeding of fish.

Many of the fish ponds are merely hollows in the ground. Others are rather low rice fields, the walls of which have been raised and re-enforced. Still others are on waste land. The ponds are of all dimensions and shapes: long or short, round, oval or square. Some ponds are supplied with rainwater; others are filled with water diverted from irrigation ditches; still others are supplied with sea water.

The industry is largely in the hands of Formosan-Chinese who cultivate fish either as their principal occupation or as a side line to agriculture, salt manufacture, deep-sea fishing or some other occupation. In 1930 there were 51,070 Formosans engaged in this industry (8,752 full-time and 42,318 part-time), whereas only 50 Japanese were so engaged (one full-time and 49 part-time). Although a somewhat higher proportion of Japanese may be expected now as compared with 1930, fish culture is markedly a Formosan-Chinese industry.

b. *Culture of sabahii, bora and other fish. Sabahii,* a favorite fish with the Chinese, constitutes the most important item of fish culture, the value of its production being ¥ 3,820,000 in 1938. In one recent year more than 1,820 fish farms raised *sabahii* with more than 17,500 acres devoted to its production. *Sabahii* are raised in both salt and fresh water ponds, mostly in the provinces of Tainan and Takao. (Although the ponds are said to be fresh water they may actually be brackish water ponds.) Near Anping salt pools for raising *sabahii* are numerous.

Small "nurse" fish are caught by net in the spring and summer when the *sabahii* approach the west coast. These are placed in clay-bottomed ponds, later being transferred to regular breeding ponds. The nurse ponds are small, about two or three acres in size, whereas some of the larger breeding ponds are more than 200 acres. During the winter months the ponds are drained and dried and the soil manured. In March or April they are filled with water and tea cakes are placed in them to kill the parasitic enemies of the fish. If the "nurse" fish are placed in the ponds in April they weigh about 6 or 7 ounces by the end of the year. At the end of the second year, at which time they are placed on the market, they average about one pound.

Grey mullet (*bora*) are also raised in both salt- and fresh-water ponds, the larger number in the latter. Fish for stocking are caught in the sea near the coast of the provinces of Tainan, Takao and southern Taichu during the months from January to March, and are transferred directly to breeding ponds. By October these fish, weighing about half a pound, are ready for market. The artificially bred mullets never attain the size of those caught in the sea.

Numerous other species are cultivated, among which *tsuohii, renhii, koi* and *kenhii* are important. These species do not propagate readily, and fish for stocking purposes are imported from China. Topminnow, imported from Hawaii in 1910, are raised in abundance to combat malaria.

TABLE 9.—*Taiwan: production of fish farms, 1929*

Type of fish or shellfish	Production (pounds)	Value (yen)
Sabahii	15,383,753	2,225,164
Oysters	6,802,042	681,020
Tsuohii	1,580,485	223,307
Renhii	1,527,278	222,884
Bora (Mullet)	1,002,020	148,454
Koi	1,065,036	122,008
Kenhii	262,053	40,333
All others [a]	374,106	71,514

[a] Includes crab, shrimp, lobster and turtle.

c. *Oyster culture.* Extensive flat banks of the coastal strip of Tainan, Taichu and Takao provinces are used for oyster beds. In one recent year, 1,525 oyster farms covered more than 7,400 acres. With the exception of some farms in Takao Province where stones are used, split bamboo stakes from 1 to 3 feet in length are employed as spat collectors. These are placed in the water in the months from October to December, about 20,000 stakes per acre. When the tide brings in oyster larvae they become attached to old shells placed on the stakes. Nourished by microscopic creatures carried with every tide, the oysters grow until after 4 or 5 months the bamboos are almost hidden under clusters of oysters. The average weight of oysters attaching to each stake is from 1¾ to 2½ pounds, the size of each oyster being rather small inasmuch as the roughness of the seas prevents leaving the oysters on the stakes for more than a year. Oysters are gathered throughout the year, but the largest number are taken during the summer months. Although the oysters can be used 60 days after the bamboo stakes have been planted, they do not reach their maturity until 5 months later. In 1929, the last year for which production data are available, 6,800,000 pounds of oysters valued at ¥ 681,000 were produced. Formosan-Chinese tend them and gather them in flat boats and rafts.

d. *Cultivation of crabs, lobsters and shrimps.* Crabs are raised chiefly in salt water. The most commonly cultivated variety is *nokogiri gasami* (scientific name not known). Most of the ponds for this purpose are rather small—averaging only 360 square feet. Some of them have open canals connecting them with larger bodies of water through which salt water flows in and out with the rise and fall of the tide. The production of each pond is approximately 1,000 crabs. The total production of crabs by cultivation in Taiwan is more than 100,000 pounds. Stocking is done in early summer, and the crabs are ready for market in the months of October, November and December.

The most commonly cultivated lobster is the *ushi* lobster, which is raised with *sabahii.* Also cultivated is *koro-ebi* or *koebi.* During the period of May to September, 4- to 5-inch lobsters are caught by nets and turned loose in ponds. After 5 or 6 months these have grown to marketable size.

Shrimps are raised in ponds with *sabahii* in both salt and fresh water. Young shrimp of one-half inch in length are caught with nets in the season from May to September and are then placed in the larger ponds. In 5 or 6 months they have grown so that 8 weigh about one pound.

2. The coral fishery

Taiwan is the largest producer of coral in the world, the value of the production varying in recent years from ¥ 210,000 to ¥ 730,000 (Table 10).

TABLE 10.—*Taiwan: value of coral production, 1933-1938*

	Yen
1933	210,000
1934	210,000
1935	730,000
1936	710,000
1937	550,000
1938	370,000

The coral beds of Taiwan are considered to be quite extensive, but to conserve resources and also with a view of keeping up market values, the government adopted a license system. Coral fishing in recent years has been limited to 50 or 60 boats. The fishing season lasts officially only from May to October.

The older coral beds are in the north near Hokasho and Menka-sho. In 1935, however, a bed was discovered near Boko-to. In 1936 grounds were found in southern Shoko-to, at Seihyo-to and in the islands within the Okinawa Gunto.

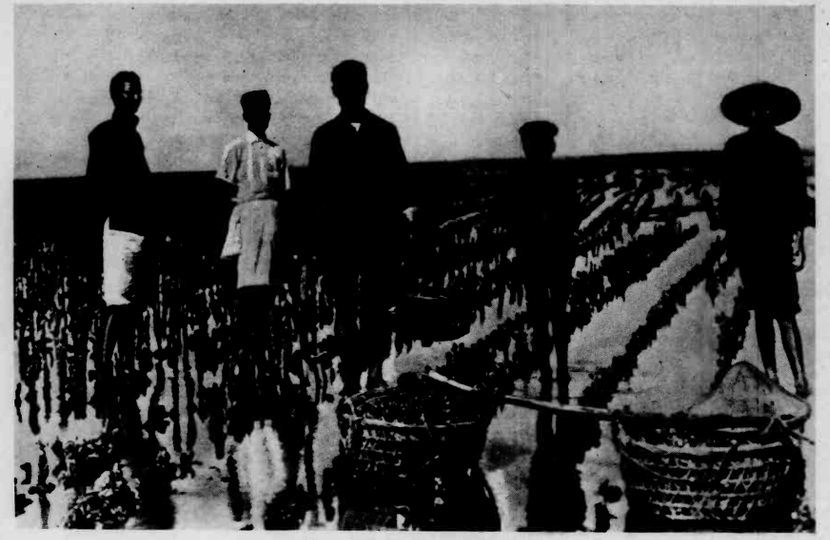


Figure 5.—Oyster culture near Rokko.

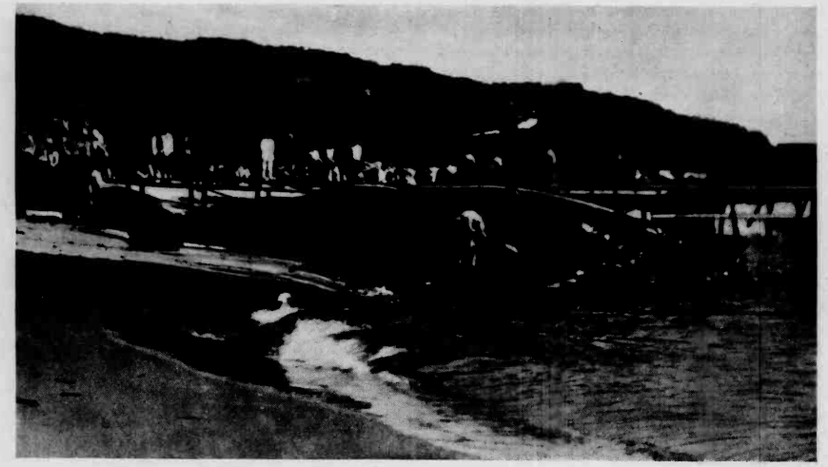


Figure 6.—Whaling at Daibanretsu.

The coral assumes various forms, some being branch-like, some fan-like, some feather-like and others in various shapes. Pink coral is most abundant, followed by white coral and still more limited quantities of red coral.

Strong nettings are used for fishing for the coral, which occurs on reefs at depths of 300 to 600 feet. First the fishing-boat crew casts the nettings, which are made of hemp rope with meshes of almost 4 inches. Weights of 25 pounds are used to carry the net to the bottom, where it is then dragged. When the fishermen think they have secured coral they raise the net to the deck. The crew of the boat consists of 6 or 7 men, each of whom handles one of the ropes to which the nets are fastened. Since such small craft are used, they often meet with disaster when overtaken by storms.

The major part of the coral is auctioned off in the market at Keelung. In 1930 about 70 per cent was purchased by merchants from Kobe who resold to Italian buyers. Efforts at that time were being made to eliminate the middlemen in Kobe and to establish direct trade with Italy, but the lack of organization among the fishermen and buyers in Taiwan prevented any great success. The lack of capital and financial inability to await good prices are also adverse factors in the regulation of sales to obtain the most favorable returns.

From 1925 to 1930 considerable attention was given to creating a local carving industry in order that Taiwan might derive more profit in the business. In former years most of the coral was shipped from Taiwan in the rough state, and by processing the coral other countries obtained a much greater percentage of profit.

In 1937, 20 persons were reported to be engaged in processing coral articles. Keelung is the center for this work.

3. Whaling

Whaling is a winter fishing pursuit in the seas off the south coast. In recent years two boats have operated from January to March from the port of Daibanretsu. The type of whale caught is the "zato" or humpback whale (*Megaptera nodosa*, Bonn). The catch, which has varied from 17 to 33 whales in recent years, is summarized in Table 11.

TABLE 11.—*Taiwan: catch of whales, 1933-1938*

	Number [1] of Whales	Value [2] (Yen)
1933	29	70,000
1934	17	55,800
1935	33	74,394
1936	19	36,516
1937	20	45,644
1938	14	29,768

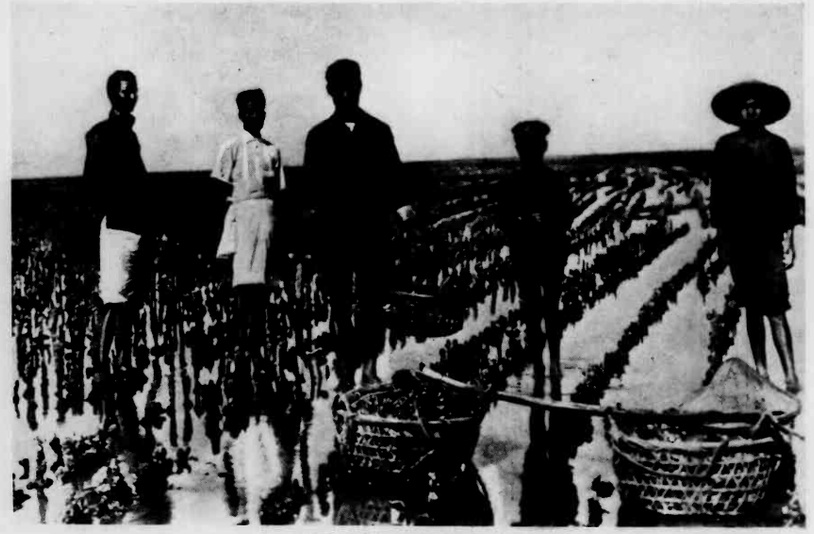
[1] In some years (1928 and 1929) the catch was more than 50 whales.
[2] The value covers the total value of flesh, oil and by-products.

4. Seaweed production

Several kinds of marine algae, most of which are consumed as food, are produced in Taiwan. Recent production of seaweed has totaled more than 1,200,000 pounds (Table 4, p. 5). Seaweed is most abundant along the northern coast and in the Pescadores.

One important seaweed product is *tengusa* or Gelidium species (chiefly *Gelidium cartilagineum*), which is the raw material for agar-agar. In Taihoku Province and the Pescadores, which are the main areas of supply, the gathering season starts in February or March and reaches its peak during April, May and June.

INTENTIONAL SECOND EXPOSURE



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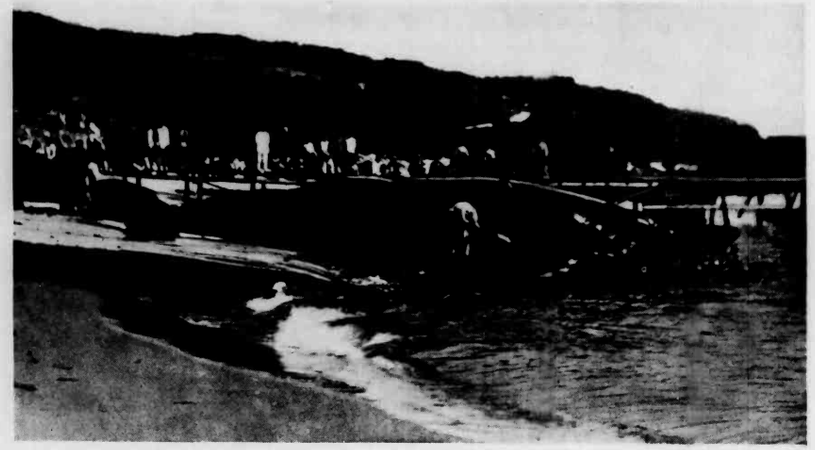

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Figure 7.—Fish market, Takao. Fish in the foreground are bonito.

VI. PROCESSING OF MARINE PRODUCTS

In recent years the processed marine products of Taiwan have amounted to 2,300,000-3,300,000 yen including 10,000,000-11,000,000 pounds of food products (Table 13). Dried and salted fish constitute the bulk of the production with dried bonito, dried soda bonito, and boiled and dried sardines as the leading products (Table 12). Dried fish is the only type of Japanese goods produced in quantity. Other products such as salt dried fish and the boiled and dried sardines are produced only for consumption within Taiwan.

TABLE 12.—*Taiwan: manufactures of chief marine products, 1929*[1]

Product	Quantity (pounds)	Value (yen)
Dried bonito	1,348,837	1,189,417
Boiled and dried sardines	3,276,099	371,647
Dried soda bonito	959,510	274,720
Fish paste [2]	1,273,360	216,685
Dried shark fins	174,356	163,295
Karasumi	65,275	98,109
Canned tuna (*maguro*)	72,123	52,236
Prepared shark fins (*taishi*)	18,705	48,731
Tai dempu	17,182	23,712

[1] Although the data given here are old, the types of manufactured products and their relative importance had not changed greatly by 1937 and 1938.

[2] Some sources list this item as fish cakes.

1. Bonito and tuna

The single most important processed fish product is dried bonito, the value of which in some recent years has amounted to 40 per cent of the total processed fish. The manufacture of dried bonito in Taiwan started in 1910 when workmen for this purpose were hired in Japan. At first the industry was not financially successful and the Taiwan government granted a subsidy to cover the losses. An additional subsidy was made to train Formosan women and girls in the manufacture of this article. Later, when the industry showed a profit, the subsidy was stopped. In 1921, when there were several hundred skilled operators, the training of workers was discontinued.

In 1938 it was reported that 51 factories were producing this product in Taiwan. Some of these "factories," however, were small, hardly deserving the name. Five were known to have operated in that year in Keelung and others in Suo and Kasho-to.

The manufacturing process involves boiling the fish for one to two hours, followed by smoking for 48 hours. (Pine-wood smoke makes the best product). A part of the catch of soda bonito is manufactured in the same way.

A large number of bonito and soda bonito cannot be manufactured into dried bonito because of excessive fat. These fish are salted and consumed in Taiwan, whereas dried bonito finds a substantial market in Japan.

TABLE 13.—*Taiwan: marine manufactures*

[In 1000 *kan*; one *kan*=8.27 pounds]

Year	Foods (volume)					Total value including others (in 1000 yen)	Non-food (in 1000 yen)				Grand total (1000 yen)
	Dried bonito	Dried fish	Salted and dried fish	Boiled and dried fish	Salted fish		Fertilizer	Fish oil	Other mfrs.	Total including others	
1932	14	118	22	585	45	1,441	12	20	68	104	1,545
1933	20	159	27	743	43	1,691	12	43	148	218	1,909
1934	44	163	85	841	167	2,102	8	13	161	189	2,291
1935	78	166	39	1,118	21	2,023	14	29	218	270	2,293
1936	92	109	30	1,160	191	2,206	9	25	243	294	2,500
1937	87	104	24	882	81	2,110	13	30	161	214	2,324
1938	17	149	20	1,052	33	2,139	6	28	185	220	2,359
1939	32	143	11	1,129	31	2,927	22	162	212	396	3,323

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In order that better financial returns be obtained from these fish, canneries have been established. In 1926 experimentation started at Karenko and later small production was initiated at Suo, Keelung and Taito. Canned boiled bonito has been exported in recent years in small quantities. The canning of tuna (*maguro*) and spearfish (*kajiki*) has been a matter of study in recent years with a view to utilizing more fully the resources of these fish. An efficient cannery for tuna was suggested in 1930, but no mention has been found of operating plants devoted to the canning of this species.

2. Shark

The manufacture of by-products from shark has increased noticeably since 1920. The flesh is used as food by the Formosans, the fins are a delicacy prized in China, and oil (probably Vitamin A oil) is obtained from the liver. In the northern part of Taiwan there is some drying and tanning of shark skin for manufacture into leather articles.

Dried shark fins and *taishi* (processed shark fins) are manufactured as by-products by those engaged in shark fishing. The former product is derived by merely drying the fins; the latter are processed in hot water from which transparent threads are obtained and dried in the sun. A dry season is necessary for the manufacture. Therefore this industry is most active from May to November in the north, and from October to May in the south.

3. Karasumi

Karasumi, or Japanese caviar, is said to compare favorably with most ordinary caviar. It is processed from the eggs of grey mullet, fish which migrate annually along the western shore in December and January. The producing areas are in the provinces of Shinchiku, Taichu, Tainan and Takao. In 1938 this product of Taiwan was valued at ¥ 290,000.

Formerly the process of manufacture was a matter of tradition, having its inception in China many years ago and being transmitted from father to son. At one time the process employed in Taiwan was quite distinct from that in Japan, but at present much of the domestic production is in the hands and under the direction of Japanese entrepreneurs. The manufacturing process consists of salting, drying and pressing.

4. Other products

Other manufactured products include salted and dried fish produced by fishermen in the coastal regions when there is an excessive supply of fresh fish. Fish thus processed—*tai*, *tobiuwo*, sardines, flying fish—are consumed entirely in Taiwan. Boiled and dried fish—sardines, mackerel, soda bonito—are in great demand among the Formosans. Salted preserves have been made from frigate mackerel, sardines, whale and flying fish. Canning of the preserves was undertaken several years ago, but is now discontinued. Dried seaweed is processed in Taihoku and the Pescadores in the season from November to April, but the product is of relatively poor quality and is consumed only in Taiwan. *Tai dempu* is manufactured in the Pescadores by crushing *tai* and adding sugar and soy sauce. Fish paste (*kamaboko*) is manufactured in the larger centers, its total production in 1938 being ¥ 190,000. In addition to the edible manufactures there is some production of carved corals in Keelung and shell carving in the Pescadores.

VII. CONSUMPTION AND TRADE

1. Domestic marketing and consumption

a. *Domestic marketing.* Many of the part-time Formosan fisherman who are also farmers use their catch directly; fish is part of their daily food provided by themselves. Commercial catches are landed at many ports but chiefly at Takao, Keelung and Suo.

To handle the catch effectively and to prevent spoilage when fish are brought to shore in quantities greater than can be disposed of immediately, refrigeration plants are needed in the major ports. The warm climate and the increasingly large amounts brought in by motor-boat fleets has made refrigeration facilities of great importance. Although many of the firms dealing in marine products have cold storage facilities, in 1930 there were only two large refrigerating plants: one at Takao and one at Keelung. The plant at Takao had a refrigerating capacity of 100 tons but only 20 tons were used for fish. The Keelung plant had a capacity of 64 tons but only 24 tons devoted to fish. Both plants used part of their capacity for the manufacture of ice for sale. Both were new in 1929 or 1930, and it is likely that additional refrigeration facilities are now available.

In 1937, 99 fish markets operated in Taiwan handling a total volume of business estimated at 114,000,000 pounds, valued at ¥ 17,000,000. The market handling the largest volume is that of Takao, followed by those of Taihoku, Keelung, Tainan, Suo, Heito, Kagi and Taichu (Table 14).

In these markets fresh fish is available throughout the year. The value of sales is in the following order: swordfish, mackerel, shark, *guchi*, *sabahii*, *eso*, *chidai*, *renkodai* and red *tai*.

Many of the markets in 1930 were under the management of and operated by municipalities, townships and villages. Large numbers, however, are operated by various aquatic or marine products societies or associations, some of which are operated by proxy by corporations or individuals.

b. *Consumption.* Accurate statistics concerning fish consumption in Taiwan are not available. The Formosans are frequently described as a fish-eating people, but the average consumption is considerably less than in Japan. The average value of fish consumed per capita in Taiwan is about ¥ 3.80 as compared with ¥ 9.30 in Japan. The consumption by weight is estimated as 40 pounds per person annually as compared with twice that amount in Japan. Some estimates of annual consumption in Taiwan are as low as 25 pounds per capita.

TABLE 14.—*Leading fish markets of Taiwan*

Market	1936		1937	
	Amount of fish handled (*kin*)	Value (yen)	Amount of fish handled (*kin*)	Value (yen)
Heito	3,062,265	435,261	3,295,039	500,001
Kagi	2,091,448	340,648	2,478,777	502,759
Keelung	4,937,346	1,047,283	5,082,984	1,109,270
Suo	4,380,384	913,445	3,865,547	762,688
Taichu	1,891,599	487,542	2,009,913	521,085
Taihoku	6,324,234	1,732,857	6,563,971	1,840,435
Tainan	4,251,671	783,383	4,944,179	906,926
Takao	12,296,125	2,724,095	13,426,918	2,947,719

1 *kin* equals 1.32 pounds.

2. Exports and imports

In spite of increased production over a period of years, Taiwan is compelled to import fish products to supply domestic demands. This excess of imports over exports is indicated in Table 15 below:

TABLE 15.—*Taiwan: foreign trade in fish, 1937 and 1938 (1,000 yen)*

	1937	1938
Exports to Japan	4,111	3,006
Exports to other countries	832	491
Gross exports	4,943	3,497
Imports from Japan	10,095	11,535
Imports from other countries	687	405
Gross imports	10,782	11,940
Surplus of imports over exports	5,839	8,443

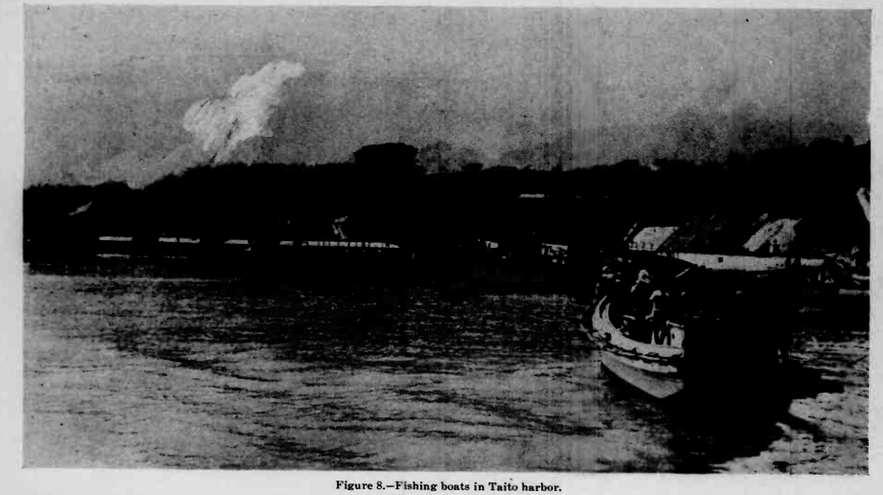


Figure 8.—Fishing boats in Taito harbor.

Figure 9.—Fish drying, east coast.

By far the greater proportion of the imports is from Japan; in 1937 more than 93 per cent of the fish imports were from Japan.

The itemization of the foreign trade in 1937 (Table 16 below), gives the nature of the trade. Some of the major items of import are types of fish not procurable in Taiwan waters. Exports consist largely of fresh fish, whereas imports are salted, dried and canned fish.

TABLE 16.—*Taiwan: quantity of fish imported and exported, 1937*[1]

[1,000 *kin*][2]

	Imports		Exports	
	From foreign countries	From Japan	To foreign countries	To Japan
Fresh fish and shellfish...	..	7,664.2	609.3	11,184.8
Salted fish:				
Herring	3,924.3	2,211.2	..	..
Trout	3,190.1	19,509.7	81.5	..
Mackerel	..	2,191.1	46.6	..
Sardine	..	551.3	71.8	..
Hairtail	..	3,114.6	..	..
Salmon	..	1,521.1	..	..
Other	32.6	125.2	84.9	..
Dried fish:				
Cod	..	1,277.0	629.6	..
Small fish	..	6,131.9	373.5	..
Cuttlefish	..	1,428.4	103.7	..
Other	.7	1,703.0	62.9	..
Shrimps and prawns (dried and salted).	9.0	2,485.5	236.5	..
Other shellfish, dried	..	..	165.8	..
Sharks fins	..	..	161.9	..
Konbu	..	403.6	214.8	..
Other fish and aquatic products.	38.5	..	74.7	..
Sea blubbers, salted	210.7	..	..	..
Whale meat	..	..	..	111.2
Katsuobushi	..	144.9	..	271.4

[1] Does not include canned fish, which is not listed separately in the trade statistics.

[2] 1 *kin* equals 1.32 lbs.

TABLE 17.—*Taiwan: fishing corporations, capital, 1938*

	Number of firms	Nominal capital (1,000 yen)	Paid-up capital (1,000 yen)	Average paid-up capital per company (1,000 yen)
Japanese corporations with offices in Japan	2	101,500	65,500	32,750
Japanese corporations with offices in Taiwan	28	5,927	3,044	109
Other corporations (mostly Formosan-Chinese)	21	429	399	19

VIII. ORGANIZATION, ADMINISTRATION, CONTROL AND AID OF THE FISHING INDUSTRY

1. Organization

Organized fishing companies are very active in Taiwan. In 1938, there were 51 companies, 30 of which were Japanese-operated and the remainder Formosan-Chinese. The average paid-up capital of the Formosan-Chinese companies was only ¥ 19,000 compared with ¥ 109,000 for 28 of the Japanese companies with offices in Taiwan, and ¥ 33,000,000 for the two Japanese companies with offices only in Japan but carrying on fishing operations in Taiwan waters (Table 17). The detailed list of the companies operating in 1938 is given in Table 18.

A merger of 11 fishing companies was reported in 1943. The company thus formed is called the South Japan Control Company, with a capital of ¥ 50,000,000. Only firms owning boats of 50 tons or more could qualify as members in this recent merger.

Firms which deal with marketing, chiefly concerned with the export trade, are listed in Table 19. Most of these firms have cold storage facilities.

In 1937, Taiwan had 62 fishing associations with a membership of 16,516. These are regulated under the amendment of the Fishing Industry Law of 1933. Table 20 summarizes the conditions of these associations in 1937.

Similar to the associations are a number of provincial aquatic or fishing societies, which subscribe members from people residing in their districts and engaging in fishing industries. The various provincial societies are represented in the Taiwan Aquatic Society, which thus serves the entire island. Table 21 indicates the budgets and work of these societies as of 1939.

TABLE 18.—*Taiwan: fishing corporations, by company*

[As of August 1939]

ORGANIZATIONS WITH HEAD OFFICE IN JAPAN

	Capital	Paid-in capital
	yen	yen
Nippon Suisan Kabushiki Kaisha (Japan Aquatic Products Corporation).	91,500,000	55,500,000
Kabushiki Kaisha Rimken Shoten (Rimkem Store, Incorporated).	10,000,000	10,000,000
Total	101,500,000	65,500,000

ORGANIZATIONS WITH HEAD OFFICE IN TAIWAN

	Capital	Paid-in capital
Taihoku Uo-ichi Kabushiki Kaisha (Taihoku Fish Market Corporation)	400,000	175,000
Otei Suisan Kabushiki Kaisha (Otei Aquatic Products Corporation)	25,000	6,250
Taiyo Gyogyo Kabushiki Kaisha (Taiwan Waters Fishing Industry Corp.)	200,000	65,415
Nikka Kinso Gyogyo Kabushiki Kaisha (Japan-China Boat Fishing Ind. Corp.)	12,000	3,000
Taiwan Kairiku Bussan Kabushiki Kaisha (Taiwan Ocean and Land Produce Corp.)	300,000	87,000
Chubu Gyogyo Kabushiki Kaisha (Central Fishing Industry Corporation)	100,000	30,000
Taiwan Suisan Hambai Kabushiki Kaisha (Taiwan Aquatic Products Marketing Corp.)	300,000	225,000
Suo Suisan Kabushiki Kaisha (Suo Aquatic Products Corporation)	40,000	30,000
Taiwan Gyogyo Kabushiki Kaisha (Taiwan Fishing Industry Corporation)	500,000	500,000
Nambu Taiwan Kaisan Kushiki Kaisha (South Taiwan Sea Products Corp.)	320,000	168,000
Takao Uo-ichi Kabushiki Kaisha (Takao Fish Marketing Corporation)	50,000	50,000
Toko Yoshoku Kabushiki Kaisha (East Harbor Fish Cultivation Corp.)	400,000	131,180
Mino Suisan Kabushiki Kaisha (Mino Aquatic Products Corporation)	25,000	6,250
Karenko Uo-ichi Kabushiki Kaisha (Karenko Fish Market Corporation)	20,000	10,000
Nankai Boeki Kabushiki Kaisha (South Ocean Trade Corporation)	20,000	20,000
Taiwan Suisan Kogyo Kabushi Kaisha (Taiwan Aquatic Products Ind. Corp.)	60,000	30,000
Kaiyo Kogyo Kabushiki Kaisha (Open Sea Promotional Corporation)	500,000	220,000
Kabushiki Kaisha Senri Shoko (Senri Business Transactions Corp.)	50,000	39,525
Rato Suisan Kabushiki Kaisha (Rato Aquatic Products Corporation)	40,000	10,000
Kabushi Kaisha Daimaru Shoko (Daimaru Business Transactions Corp.)	50,000	12,500
Taiwan Sengyo Hambai Kabushiki Kaisha (Taiwan Fresh Fish Marketing Corp.)	50,000	37,500
Miwa Suisan Kabushiki Kaisha (Miwa Aquatic Products Corporation)	200,000	50,000
Sengen Suisan Kabushiki Kaisha (Sengen Aquatic Products Corporation)	20,000	5,000
Shazokki Shoji Kabushiki Kaisha (Shazokki Business Matters Corp.)	120,000	30,000
Taiwan Gyogu Kabushiki Kaisha (Taiwan Fishing Equipment Corp.)	60,000	30,000
Kagi Uo-ichi Kabushiki Kaisha (Kagi Fish Market Corporation)	50,000	12,500
Takao Kaiso Saishu Hambai Kabushiki Kaisha (Takao Sea-weed Procuring and Marketing Corp.)	60,000	60,000
Takuo-yo Suisan Kabushi Kaisha (Ocean Colonization Aquatic Products Corp.)	2,000,000	1,000,000
Total (28 corporations)	5,972,000	3,044,120

OTHER KINDS OF CORPORATIONS

	Capital	Paid-in capital
Taika Suisan Go-shi Kaisha (Taika Aquatic Products Ltd. Partnership)	50,000	40,000
Go-mei Kaisha Asahi Gyogyo Gumi (Asahi Fishing Industry Group, Unltd.)	6,000	6,000
Taiwan Yobetsu Go-shi Kaisha (Taiwan Snapping Turtle Cultivation, Ltd.)	80,000	80,000
Toko Shokusan Go-shi Kaisha (East Harbor Fish Nursery, Ltd. Partnership)	30,000	10, 000
Goshi Kaisha Bunki Shoko (Bunki Business Transactions, Ltd., Partnership)	15,000	15,000
Goshi Kaisha Kentoryu Shoko (Kentoryu Business Transactions, Ltd., Partnership)	10,000	10,000
Keelung Kaisan Go-shi Kaisha (Keelung Sea Products, Ltd. Partnership)	12,000	12,000
Tainan Suisan Yoshoku Go-shi Kaisha (Tainan Aquatic Cultivation, Ltd. Partnership)	30,000	30,000
Go-shi Kaisha Shinsei Shoko (Shinsei Business Transactions, Ltd. Partnership)	20,000	20,000
Hobi Go-shi Kaisha (Hobi Ltd. Partnership)	5,000	5,000
Eiwaryu Go-mei Kaisha (Eiwaryu Unlimited Partnership)	10,000	10,000
Go-mei Kaisha Ryugen Shoko (Ryugen Business Transaction, Ltd. Partnership)	10,000	10,000
Sangen Go-shi Kaisha (Sangen, Ltd. Partnership)	2,000	2,000
Kineiho Go-shi Kaishi (Kineiho, Ltd. Partnership)	8,000	8,000
Shuho Kaisan Go-mei Kaisha (Shuho Sea Products, Unlimited, Parnership)	10,000	10,000
Horai Kogyo Shintaku Go-shi Kaisha (Horai Promotional Trust, Ltd. Partnership)	10,000	10,000
Go-shi Kaisha Chuwa Shoko (Chuwa Business Transaction, Ltd. Partnership)	10,000	10,000
Go-shi Kaisha Shinsuri Shoko (Shinsuri Business Transaction, Ltd. Partnership)	20,000	20,000
Go-shi Hyogyokuchin Shoko (Hyogyokuchin, Ltd. Partnership)	35,000	35,000
Go-shi Kaisha Shuhyakunen Shoko (One Hundred Year Anniversary Business Transaction, Ltd. Partnership)	20,000	20,000
Go-shi Kaisha Chinyuho Shoko (Chinyuho Business Transaction, Ltd. Partnership)	36,000	36,000
Total (21 corporations)	429,000	399,000

TABLE 19.—*Taiwan: firms dealing with marine products*

[Most of these firms have cold storage facilities.]

Hayashi Kane Shoten, fish and shellfish (J)	53 Hama-cho, Keelung
Jun Bee Kaisanbu, marine products exporter	47 Asahi-machi, 1 chome, Keelung
Lee Kee and Co., marine products exporter (F)	29 Fukutoku-machi, 1–chome, Kiirun
Mikawa Shoko	5 Asahi-machi, 1–chome, Keelung
Taihoko Chuo Shijo K. K. (J)	5 Kotoboki-cho, 5–chome, Taihoku
Shin Senri Shoko, exporters	43 Asahi-machi, 1–chome, Keelung
Sie Zu Kee and Co., exporters	79 Tamada-cho, 2–chome, Keelung
Taiwan Kairiku Bussan K. K., equipment	39 Asahi-machi, 2–chome, Keelung
Taiwan Suisana Hanbai K. K., equipment	5 Asahi-machi, 3–chome, Keelung
Takao Uo-Ichi K. K., equipment	10 Shin-Hama-cho, 2–chome, Takao
Nippon Suisan K. K., equipment (J)	53 Hama-cho, Keelung
Taiwan Coral Export Association	Taihoku
Takao Chuo Oroshi-Shijo K. K., (J)	3 Kitano, 3–chome, Takao

The use of (F) or (J) indicates present Formosan-Chinese or Japanese management, where known.

TABLE 20.—*Taiwan: fishing industry associations as of December 31, 1937*

Number of associations:	
Fishing industry united associations	16
Non-fund contributing association	1
Non-liability associations	45
	62
Number of association members:	
Fishing industry united associations	5,197
Non-fund contributing associations[1]	119
Non-liability associations	11,200
	16,516
Number of associations using cooperative equipment:	
Economic facilities:	
Processing facility	1
Storage facility	2
Marketing facility	45
Purchasing facility	5
Loans of funds	28
Loans of other than funds	5
Non-economic facilities:	
Docking facility	1
Boat-house facility	3
Boat embankment	6
Dry dock	8
Fishing equipment warehouse, net drying and manufacturing factories	19
Facility for prevention of ship distress and relief	17
Other facility	19
Capital:	
Total capital	¥ 107,540
Paid-in capital	68,444
Security fund	92,815

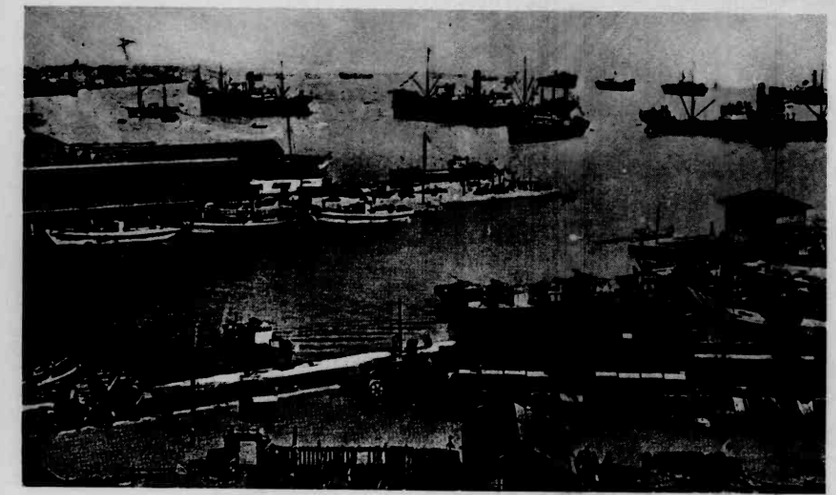


Figure 10.—Takao Harbor.

Figure 11.—Cormorant fishing in Tamsui River at Shinten (near Taihoku).

TABLE 20—Continued

Reserve fund:	
Foundation fund	¥ 29,551
Reserve fund	20,426
Other reserves	106,347
	156,324
Funds borrowed by:	
Fishing industry united association	¥ 81,676
Non-fund contributing association	1,411
Non-liability associations	24,709
	107,796
Amount of sale by:	
Fishing industry united association	¥1,225,285
Non-fund contributing association	none
Non-liability associations	1,444,916
	2,670,201
Amount of purchase by:	
Fishing industry united association	¥ 16,012
Non-fund contributing association	1,222
Non-liability associations	1,582
	18,816
Amount of loans extended to:	
Fishing industry united association	¥ 40,402
Non-fund contributing association	1,431
Non-liability associations	27,911
	69,744

[1]Given in source as "fund contributing association," but this appears to be in error.

2. Administration and control

The government-general of Taiwan regulates and controls the fisheries. It governs the operations of trawlers and drag-nets and establishes forbidden zones for these fisheries. It sets up fishing districts and establishes periods for fishing. It determines tools and methods and limits the weight of certain catches. The government-general maintains aquatic products inspection stations in Keelung and Tainan. Some of the provinces have separate departments which deal with the regulatory aspects of the fisheries as well as providing aid to the industry (Table 22).

3. Government aid

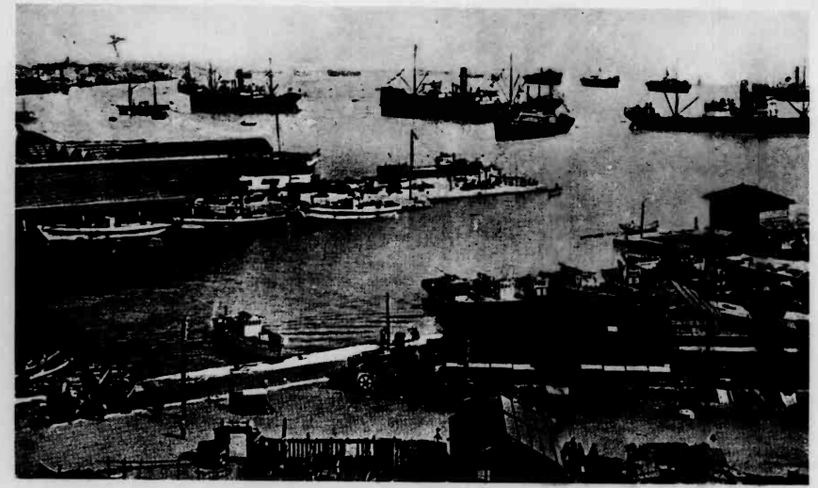
The fishing industry has had active encouragement and aid from the Taiwan government-general and from provincial governments for many years. Coordination of this assistance is under the direction of the Division of marine industries of the government-general. The activities deal largely with three aspects of the industry: sea fishing, fish culture, and manufacturing.

The greatest aid to fishing is through the study of fishing grounds fostered by the Marine products experiment station at Keelung and several provincial governments. Considerable research has been carried out concerning the relation of migratory movements of fish to ocean currents. A number of experimental ships have been built and put into operation to facilitate the study of fishing prospects and conditions. In 1937 both the central government and several of the provincial

TABLE 21.—*Taiwan: aquatic societies, 1939*

Name of society	Date of establishment	1939 Budget		Most important projects undertaken
		Ordinary Account	Special Account	
		Yen	*Yen*	
Taiwan Aquatic Society	1928	123,325	..	Short course; lectures; subsidizing collection of shark skin recommended for purchase.
Taihoku Aquatic Society	1925	128,197	73,390	Experimental survey; encouragement of fishing; management of fish market and wireless for fishing industry; relief; loans for coral fishing.
Shinchiku Aquatic Society	1924	37,149	14,720	Management of fishing market; loans for aquatic industry.
Taichu Aquatic Society	1930	20,956	..	Short course; lecture; guidance and encouragement; various surveys.
Tainan Aquatic Society	1925	20,966	1,012	Short course; encouragement and subsidy; ship distress assistance.
Takao Aquatic Society	1924	33,802	246,186	Guidance and encouragement; management of fish market; fish harbor; wireless; subsidy; ship distress relief; loans for aquatic purposes.
Taito Aquatic Society	1935	24,584	..	Management of fish market; various experiments; encouragement; management of boat-house; ship distress relief.
Karenko-cho Aquatic Society	1938	57,706	..	Management of fish market and boat-house; survey of fishing grounds.
Boko-cho Aquatic Society	1927	38,835	..	Management of fish market and cold storage; guidance and encouragement; ship distress relief.

INTENTIONAL SECOND EXPOSURE



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governments (Taihoku, Takao, Taichu and Shinchiku) had experimental ships.

These vessels are known to have undertaken surveys of bonito and tuna grounds north and east of Taiwan—snapper, *sahara* and shark fishing grounds—and the shallow-water grounds of the East China Sea. In recent years they extended their research to seas off South China and in the waters of the South Seas. The shift in emphasis in Taiwan's fishing industry from coastal to deep-sea fishing is in part related to these surveys.

To aid fish culture a fresh water cultivation experiment station was established in Shinchiku Province in 1913, and a salt water cultivation experiment station at Tainan in 1919. These stations, which investigated the culture of carp, top-minnow, frogs (from stock imported from the United States), oysters, pearls, sponges and various kinds of salt water fish, merged to form the present Tainan branch aquatic experimental station. In recent years cultivation experiments have also been made with lobsters, snapping turtles and eels.

Assisted by the government, the manufacture of various products has been studied: improved dried bonito, utilization of bonito and shark by-products, boiled dried sardine, dried mullet roe, canned fish; refrigerated fish and smoked fish. A dried bonito experimental factory was constructed at Keelung in 1923. By 1935, through improvements in the methods of preparation, the Taiwan dried bonito was reported to be up to a standard as good as the best produced in Japan. In 1933 a canning machine was equipped to undertake experimental fishing vessel canning.

From time to time, subsidies have been granted either for the direct benefit of a particular phase of the industry or for the training of workmen in that particular phase, as has been noted in connection with the manufacture of dried bonito and in the carved coral industry.

Plans for improving the storage and handling of catches have been formulated by the government and are being carried out. The importance of this aspect of the industry is great, for in 1930 it was reported that 20 per cent of the actual production was thrown back into the sea or spoiled because of lack of ready market or storage facilities.

The government-general has also promoted the construction of improved fishing vessels and implements; has aided in purchasing new equipment for canneries; has given subsidies to encourage fishing companies and the purchase of boats; and has promoted the influx of Japanese fishermen to Taiwan. A special radio station has been provided at Takao, to which ships report the occurrence of fish runs, the information then being repeated by radio telephone to fishing boats at sea. (A similar station was planned for Keelung but it is not known whether this was established.)

In 1936 an aquatic training center was opened at Keelung and a ship of the 100-ton class was attached to it. This training center, which annually enrolled about 50 students, has a three-year course of study with work in four fields: fishing, fish processing, fish culture and fish management.

TABLE 22.—*Taiwan: government administrative and research agencies concerned with the fishing industry*

Government-general of Taiwan:

Under the Office of industrial production are two units which deal with fisheries:

1. *Marine products experiment station* (*Suisan Shikenjo*) at Keelung. This station had in 1938 a chief, one assistant and six technicians. A branch of this institution with three technicians and one clerical worker is at Tainan.
2. *Marine products training school* (*Suisan Koshu-jo*). The personnel of this school at Keelung includes a chief and seven technicians.

Provincial governments:

Taihoku provincial government has a marine products inspection bureau located at Keelung.

Shinchiku provincial government has a section entitled marine products research institute (*Suisan Kenkyu-jo*).

Taichu Province has a marine products investigation institute (*Suisan Shikken jo*).

Tainan provincial government has a marine products experiment station (*Suisan Kenkyu-jo*).

Takao Province has a marine products research institute.

APPENDIX A. NOTES ON FISHING INDUSTRY OF THE PESCADORES

1. The sea catch of the Pescadores has increased considerably in recent years. In 1939 the catch was valued at ¥ 1,500,000.
2. There are two very prosperous grounds for the sea fisheries based on the Pescadores Islands: (a) in the south of the island group where a branch stream of the Black current meets with another current running south from the North China Sea and forms the so-called Formosa Bank; and (b) in the South China Sea.
3. Especially during April and May large schools of fish are taken on the banks but some types of fishing take place all year around. (See Table 23 below).
4. Many varieties of fish are caught. Red *tai*, sardine, shark and bonito are taken in large numbers.
5. More than 6,000 persons are engaged in commercial fishing (Table 23 below). On some islands the inhabitants are chiefly fishermen.
6. Drag-nets, drift-nets, *sekko* fishing, hook-and-line and other methods are in common usage (Table 24, below).

TABLE 23.—*Pescadores: kinds of fisheries and number of persons engaged in fishing, 1930*

Kind of fishing	Fishing seasons	Persons engaged
Red sea bream casting methods	All year round	552
Shark casting	" " "	319
Drag-net fishing	" " "	1,932
Sahara fishing	From April to August	480
Bonito fishing	From April to August	
By means of drift net	From October to March	264
Casting net from shore	From October to March	
Takiyose net by use of fire to attract fish	From April to October	984
Other methods		1,690
	Total	6,212

TABLE 24.—*Pescadores: total fish hauls, 1926-1928*
(in *kan*)[1]

Fishing methods	1926	1927	1928
Tai (red sea bream) Casting method	93,000	74,000[2]	78,000
Shark casting method	16,500	18,600	35,600
Drag net method	40,000	37,000	45,000
Sahara By means of drift nets	48,000	59,000	73,000
Bonito:			
By means of drift nets	16,500	24,800	36,000
By means of casting nets from shore	58,500	51,000	56,000
Takiyose net By use of fire to attract fish	43,000	45,000	47,500
Sekko fishing (nets made of bamboo)	51,000	66,000	62,000
Funebiki Ami: Dragging nets by means of boats	48,000	57,000	55,000
Other methods	102,238	130,609	100,573
Total	516,738	563,009	588,673

[1]Source does not indicate unit of catch. Figures are presumably in *kan* (8.27 pounds).
[2]This figure is given as 7,400 in the source. 74,000 is probably the correct figure, in which case the total is also correct.

7. Small fishing ports dot the coast. Mako is the single largest fishing port.
8. Both motor boats and Chinese style fishing craft are employed.
9. The yield of coral fishing in 1939 amounted to ¥ 200,000. Coral fishing is under direct government regulation and requires a government license. Coral is found near Boko-to

and in the reefs around Shoguno-sho and Tokichi-sho.

10. Salt and dried fish, shark fins, boiled fish paste, skinned shrimp, shredded red seabream and certain kinds of dried seaweed are the processed fish products. The West Taiwan Marine Products Company (Nishi Taiwan Suisan K.K.) founded in 1939 and located at Mako dominates the processing industry. It also has marketing functions and maintains an ice-manufacturing and cold-storage plant.
11. Fishery associations and cooperatives are active in the fishing industry of the Pescadores. The associations are composed of fishermen who live in the district in which the association is located. Would-be members must file an application and an admission fee is required.
12. After allocation of the fishing catch among the members of the association, or among the fishermen and crews in the case of cooperatives, the distribution of income is as follows:

    (a) Fishing by means of motor boats. Of the total amount earned by a haul, all expenses for oil, ice, bait and provisions are deducted, and the remainder is equally divided among the shareholders and fishermen.

    (b) Fishing by means of Chinese-style fishing boats. The total amount earned on a haul is divided into ten equal parts: one part for the boat, two parts for the fishing equipment, and one part for each fisherman (the crew usually consists of seven members).

    (c) Fishing by other means. In cases of equal investment of the managers, the earnings are divided equally.

13. Fishing associations dispose of their surplus money in the following manner at the end of the fiscal year: reserve fund, 30 per cent; fund for disaster relief, 10 per cent; fund for enterprises, 20 per cent; dividends for the members of the association, 40 per cent. The reserve funds are used for the purchase of equipment.

APPENDIX B. NOTES ON FISHING INDUSTRY OF TAKAO PROVINCE

1. Almost 40 per cent of Taiwan's marine products come from Takao Province.
2. Several hundred boats were engaged in recent years in net fishing from Takao. The catch includes several hundred thousand *kan* of each of the following: tuna, swordfish and sharks.
3. In a recent year the fishing operations from Takao were described as follows: boats of 10 to 25 horsepower made one-day fishing trips; 30 to 35 horsepower, 7 to 12 days; 40 to 60 horsepower, 10 to 14 days; 80 horsepower and more, 15 to 18 days. Records are available of three very active fishing boats, one of 11 tons and 15 horsepower which made 82 trips during 1928; another of 17 tons and 25 horsepower which made 38 trips; and a third of 25 tons and 50 horsepower which made 29 trips during the year. The smallest ship had a total catch valued at ¥ 14,000; the second, ¥ 23,000; and the largest, ¥ 28,000.
4. Fishing seasons for some types of fish caught are summarized as follows:

    (a) Swordfish.

    (1) *Korokawa* (Black-skin). The year around. Most abundant in January and February. The fishing ground is 7 or 8 miles southwest of Takao.

    (2) *Basho-Kajiki* (Banana swordfish). From April to July. Most abundant in May or June. The fishing ground is 50 or 60 miles southwest of Sho Ryukyu Island.

    (b) Tuna.

    (1) *Kiwada* (Tuna). The year around. Most abundant in November, December, April, May, June. The fishing ground is 70 or 80 miles southwest of Sho Ryukyu Island as well as off-shore from Manila.

    (2) *Mebachi*. From April to June. Fishing ground is 150 miles southeast of Takao.

    (c) Shark.

    (1) *Hiragashira* (Flat-head shark). Season: January to April.

    (2) *Hirozame* (Wide shark?). Season: the year around.

    (3) *Shumokusame* (Hammer-head shark). Season: October to April.

    (4) *Onagasame* (Long-tail shark?). Season: October to April.

    (5) *Yoshikiri*. Season: January to April.
5. A marine experimental station is maintained at the city of Takao, together with an experimental fishing vessel, the *Takao Maru*.
6. At Takao a special radio station is equipped to receive reports of fish runs and to repeat the signals by radio-telephone to boats at sea.

APPENDIX C. FOREIGN ECONOMIC ADMINISTRATION FISHING KITS FOR SMALL-SCALE OPERATIONS

In 1942 the Foreign Economic Administration (then the Board of Economic Warfare) devised a fishing kit for small-scale commercial operations in the South Pacific. It is composed of an assortment of apparatus which can be used under various fishing conditions and circumstances and can be easily transported. One or more of these kits, assigned to military bases or to local settlements, can provide a considerable amount of fresh fish for immediate consumption. These kits, which have now been used in the Solomons, Fijis, New Hebrides and other parts of the South Pacific, have proved excellent producers, although as a result of use in these areas, several changes have been suggested.

The kits are made up of simple types of standard fishing gear which can be fished in the coastal areas and around the reefs from small motor boats or rowboats and canoes. It is estimated the gear in each kit will catch 2,000 to 6,000 pounds of fish per week, depending upon the amount of the different types of gear used at one time; and, of course, on the presence and kinds of fish in the area.

In detail each kit contains the following:

Nets:

One complete haul seine.
One complete gill net.
One complete trammel net.

Lines:

Three complete sets of trawl lines.
Twelve complete hand lines (trolling lines).

Traps:

One fish trap (collapsed).
Two crayfish traps (collapsed).

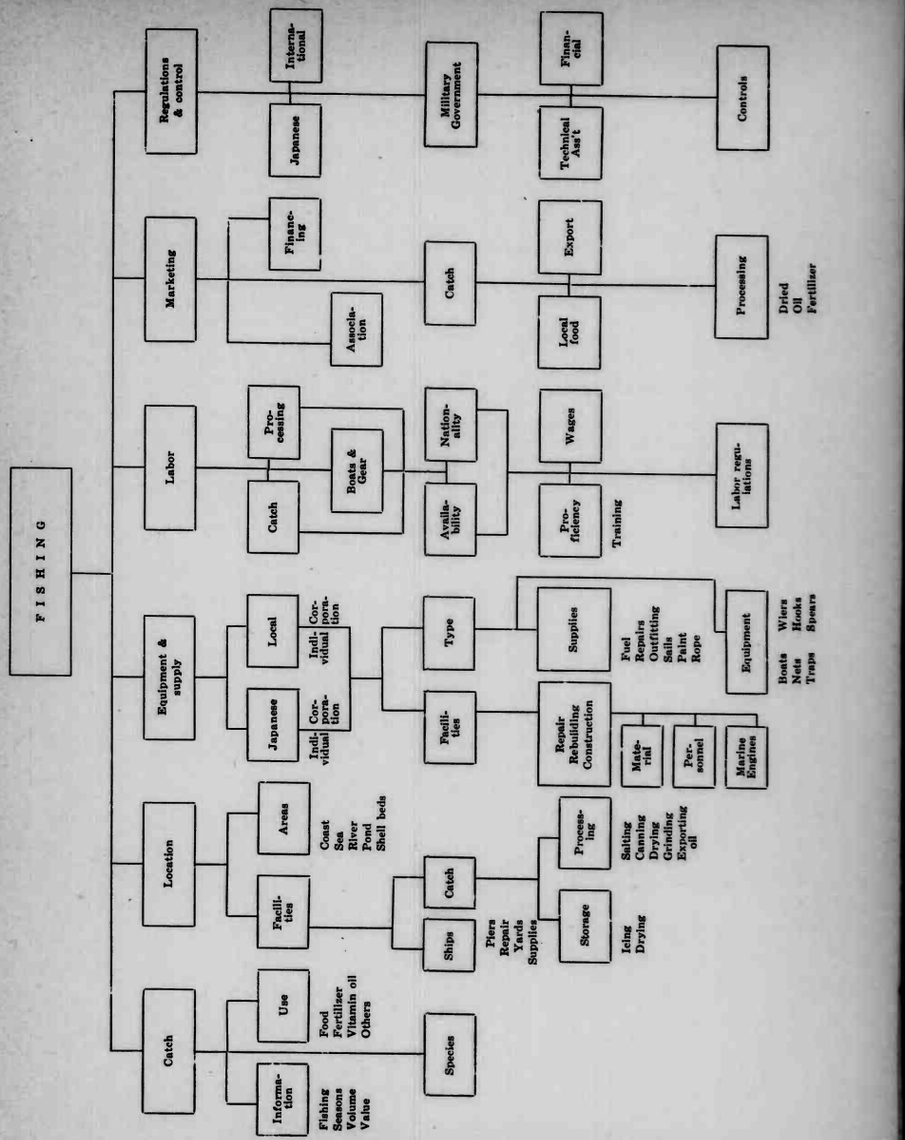
Accessories:

An assortment of hooks, lines, lures, leaders, swivels, sinkers, snaps, rings, etc., for the construction of trolling gear and shark set lines.
Six fish knives.
Two gaff hooks.
One dip net.
Mending apparatus.

All of this equipment is assembled compactly in plainly marked packages which, if necessary, can be shipped by airplane. The material in each kit as packed will weigh 1,100 pounds, and will occupy 100 cubic feet of space.

These kits are now available through Naval channels, and may be ordered via CinCPAC-POA. Additional information may be obtained from the Chief of Naval Operations, Central Division, Military Government Section (Op. 13-2), Washington 25, D. C.

APPENDIX D. PRELIMINARY WORK CHART OF THE FISHING INDUSTRY FOR THE PLANNING OF MILITARY GOVERNMENT IN CERTAIN PACIFIC AREAS



BIBLIOGRAPHY

Alvarez, José María. *Formosa, Geografía e Historicamente Considerada.*

Annual Return of the Trade of Taiwan. Department of Finance, Government-General of Taiwan. 1936 and 1937 volumes.

"Boko-cho suisangyo-chosa" (Investigation of Marine Products Industry of Pescadores) *Suisankai* No. 567 (February 1930), Tokyo.

Dai nippon teikoku tokei nenkan (Japanese Empire Statistical Yearbook). Tokyo.

Far East Yearbook, Asia Statistics Co., Tokyo; 1941 latest issue available; section on Taiwan.

Goldschmidt, R. B., *Neu Japan,* Berlin, 1927.

Grajdanzev, Andrew J. *Formosa Today,* New York, Institute of Pacific Relations, 1942.

Iehisa, Satoru "Trawl Fishing Grounds in the South China Sea." *Bulletin of the Japanese Society of Scientific Fisheries.* Vol. 8, No. 1 (May 1939).

JANIS Report on Taiwan.

Japan-Manchukuo Yearbook, The Japan-Manchukuo Yearbook Co., Tokyo, 1941 latest issue available; section on Taiwan.

Japan Times and Mail. "Japan's Progress Number," July 1935 (section on Taiwan) and "Aquatic Industry Number", February 1935.

Konda, S. *A Geography of the Marine Industry of Japan.* (Translated from Japanese) Tokyo, 1936.

Progressive Formosa, Government-General of Taiwan, 1926, section on marine industry.

Reed, Charles S. II "The Fishing Industry in Taiwan" Consular report, Taihoku, Taiwan, August 31, 1931.

Schepers, Hansjulius, *Japan's Seefisherei,* Breslau, 1935.

Suisan Nempo (Fisheries Yearbook), 1938 and 1940 volumes, Tokyo.

Taiwan, A Unique Colonial Record, 1937-38, published by the Kokusai Nippon Kyokai.

Taiwan jijo, (Conditions in Taiwan), Government-General of Taiwan, Taihoku, December 1939. Section 20—Marine Products.

"Takao ni okeru suisan-jokyo" (Marine Products Conditions in Takao) *Suisankai,* No. 567 (February 1930), Tokyo.

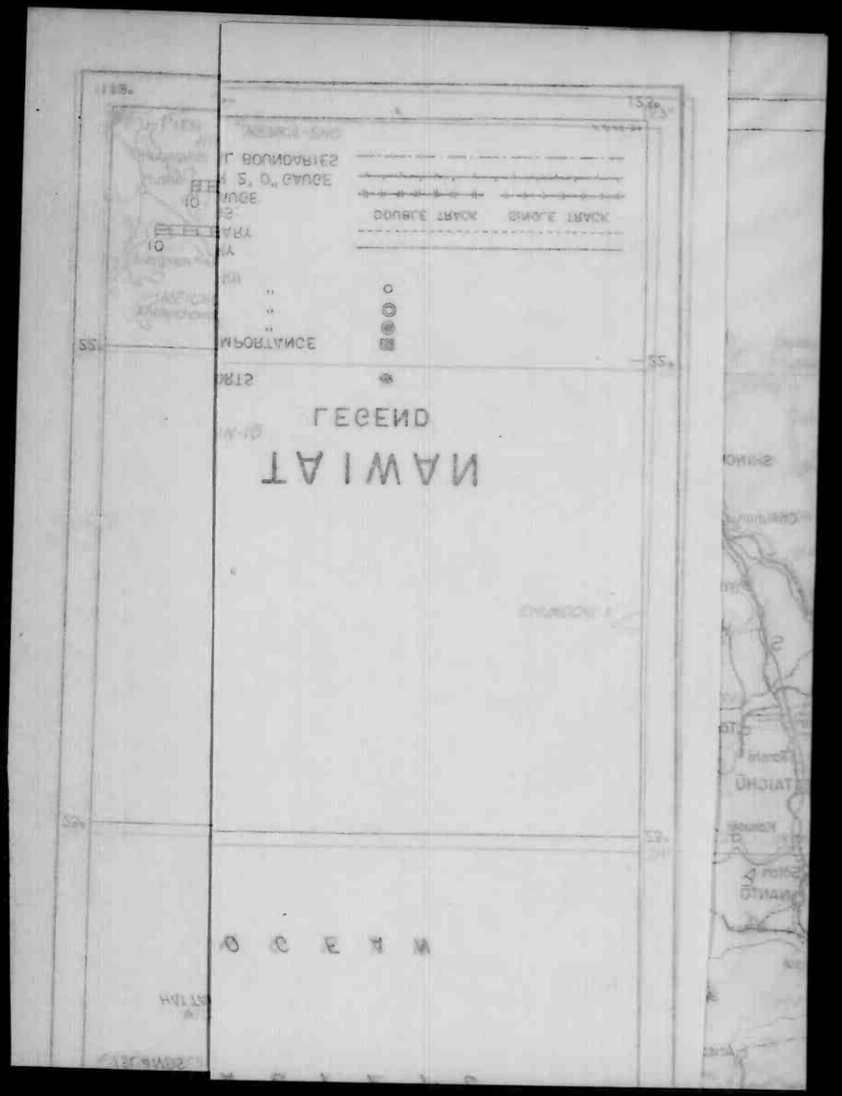
Tokyo Chigaku-Kyokwai (Journal of the Tokyo Geographical Society). Note in April 1926 number on fishing in Taiwan, Tokyo.

United Fishing Corporation and Its Enterprises, Tokyo, October 1929.

United States Navy Department, Chief of Naval Operations, Washington, D. C. OPNAV50E-12, Restricted, Civil Affairs Handbook, *Taiwan (Formosa),* 15 June 1944.

—— OPNAV50E-13 Restricted, Civil Affairs Handbook, *Taiwan (Formosa)—Economic Supplement,* 1 June 1944.

☆U. S. Government Printing Office: 1944—611035



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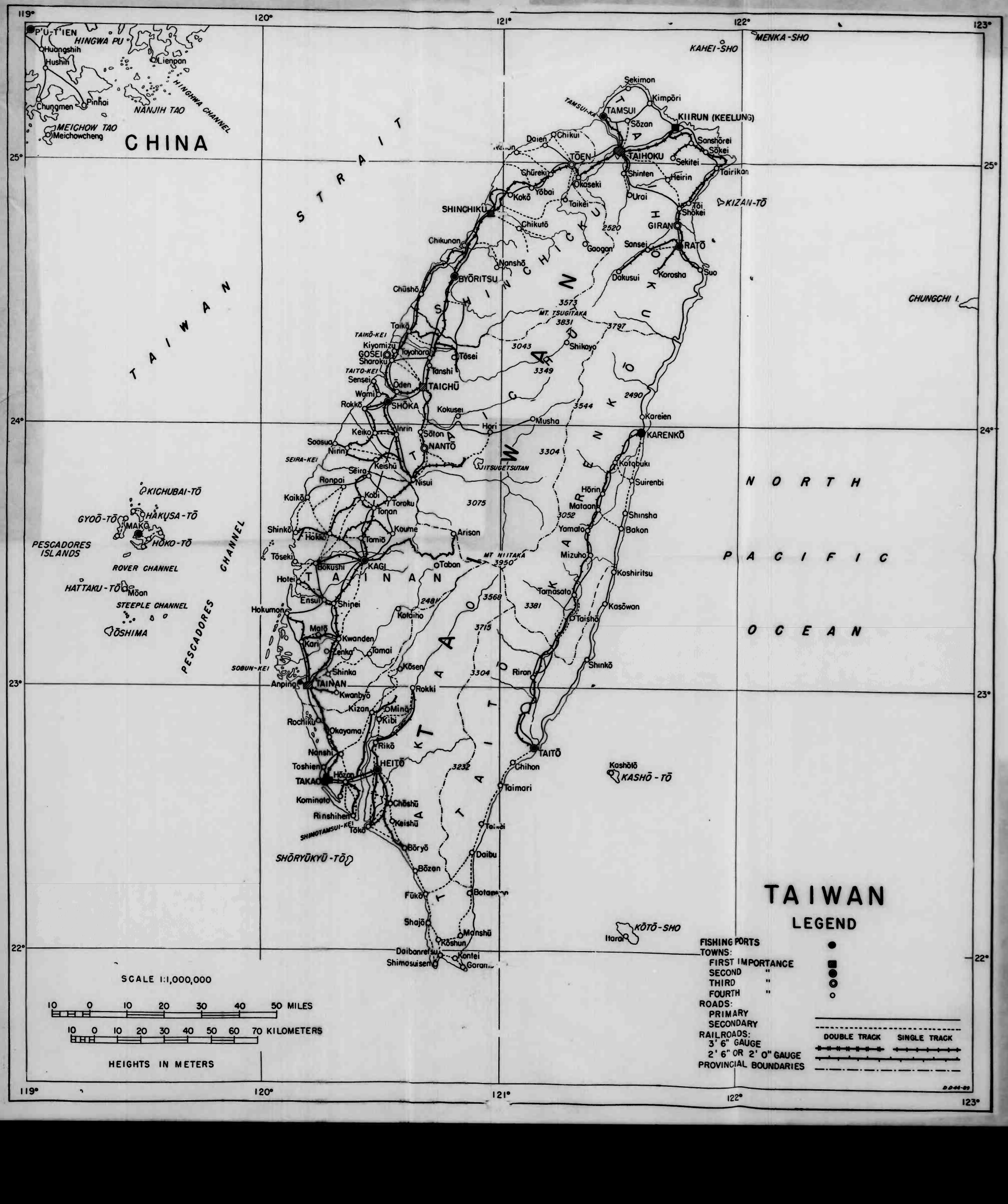
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